# Test Report

**Product:** Open Wireless Headset

**Trade Mark:** Estemxia

**Model Number:** JC-01

**FCC ID:** 2BOEW-JC01

**Prepared for**

Sinoaw Intelligent Technology (Dongguan) Co., Ltd

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**Prepared by**

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# TEST RESULT CERTIFICATION

| | |
|---|---|
| **Applicant's Name**..... : | Sinoaw Intelligent Technology (Dongguan) Co., Ltd |
| Address ..... : | Room 301, Building 5, No. 155 Shima Jianshe Road, Tangxia Town, Dongguan City, Guangdong Province, China |
| **Manufacturer's Name** ..... : | Sinoaw Intelligent Technology (Dongguan) Co., Ltd |
| Address ..... : | Room 301, Building 5, No. 155 Shima Jianshe Road, Tangxia Town, Dongguan City, Guangdong Province, China |

**Product description**

| | |
|---|---|
| Product name ..... : | Open Wireless Headset |
| Model Number ..... : | JC-01 |
| **Standards** ..... : | FCC Part 15.247 |
| Test procedure ..... : | IEEE/ANSI C63.10-2020<br>KDB 558074 D01 15.247 Meas Guidance v05r02 |

This device described above has been tested by Shenzhen HongBiao Certification& Testing Co., Ltd and the test results show that the equipment under test (EUT) is in compliance with the EMC requirements. And it is applicable only to the tested sample identified in the report.

**Date of Test**

| | |
|---|---|
| Date (s) of performance of tests .....: | Mar. 21, 2025~ Mar. 27, 2025 |
| Test Result.....: | **Pass** |

**Testing Engineer** : Zoe Su

(Zoe Su)

**Technical Manager** : Gary Lu

(Gary Lu)

**Authorized Signatory** : Leo Su

(Leo Su)

## Revision History

| Revised No. | Date of Issue | Description |
|---|---|---|
| 01 | Mar. 27, 2025 | Original |
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# 1 General Description

## 1.1 Description of EUT

| | |
|---|---|
| Product name: | Open Wireless Headset |
| Model name: | JC-01 |
| Series Model: | N/A |
| Different of series model: | N/A |
| Operation frequency: | 2402-2480MHz |
| Modulation type: | GFSK, π/4-DQPSK, 8DPSK |
| Bit Rate of transmitter: | 1 Mbps, 2Mbps, 3Mbps |
| Antenna type: | Ceramic Antenna |
| Antenna gain: | 2.78dBi |
| Max. output power: | 3.09dBm |
| Hardware version: | V1.0 |
| Software version: | V1.0 |
| Battery: | DC 3.7V, 300mAh |
| Power supply: | Input: 5V⎓250mA<br>Capacity: 300mAh |
| Adapter information: | N/A |

## 1.2 Test Mode

| Test Mode | Channel | Frequency (MHz) |
|---|---|---|
| 1 | 00 | 2402 |
| 2 | 39 | 2441 |
| 3 | 78 | 2480 |

## 1.3 Operation Channel List

| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---|---|---|---|---|---|
| 00 | 2402 | 27 | 2429 | 54 | 2456 |
| 01 | 2403 | 28 | 2430 | 55 | 2457 |
| 02 | 2404 | 29 | 2431 | 56 | 2458 |
| 03 | 2405 | 30 | 2432 | 57 | 2459 |
| 04 | 2406 | 31 | 2433 | 58 | 2460 |

| | | | | | |
|---|---|---|---|---|---|
| 05 | 2407 | 32 | 2434 | 59 | 2461 |
| 06 | 2408 | 33 | 2435 | 60 | 2462 |
| 07 | 2409 | 34 | 2436 | 61 | 2463 |
| 08 | 2410 | 35 | 2437 | 62 | 2464 |
| 09 | 2411 | 36 | 2438 | 63 | 2465 |
| 10 | 2412 | 37 | 2439 | 64 | 2466 |
| 11 | 2413 | 38 | 2440 | 65 | 2467 |
| 12 | 2414 | 39 | 2441 | 66 | 2468 |
| 13 | 2415 | 40 | 2442 | 67 | 2469 |
| 14 | 2416 | 41 | 2443 | 68 | 2470 |
| 15 | 2417 | 42 | 2444 | 69 | 2471 |
| 16 | 2418 | 43 | 2445 | 70 | 2472 |
| 17 | 2419 | 44 | 2446 | 71 | 2473 |
| 18 | 2420 | 45 | 2447 | 72 | 2474 |
| 19 | 2421 | 46 | 2448 | 73 | 2475 |
| 20 | 2422 | 47 | 2449 | 74 | 2476 |
| 21 | 2423 | 48 | 2450 | 75 | 2477 |
| 22 | 2424 | 49 | 2451 | 76 | 2478 |
| 23 | 2425 | 50 | 2452 | 77 | 2479 |
| 24 | 2426 | 51 | 2453 | 78 | 2480 |
| 25 | 2427 | 52 | 2454 | -- | -- |
| 26 | 2428 | 53 | 2455 | -- | -- |

## 1.4 Test Setup

See photographs of the test setup in the report for the actual setup and connections between EUT and support equipment.

## 1.5 Power setting configuration parameters

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters.

| Test software Version | | BT_Tool | |
|---|---|---|---|
| Frequency | 2402 MHz | 2441 MHz | 2480 MHz |
| Parameters | Default | Default | Default |
| RF cable | | | |
| Description | Connector | Length | Supplied by |
| Antenna Cable | SMA | 10cm | Applicant |

Note: Disclaimer: the loss of RF cable is too small and can be ignored.

## 1.6 Ancillary Equipment

| Equipment | Model | S/N | Manufacturer |
|---|---|---|---|
| Adapter | CD289 | 35810 | Ugreen Group Limited |
| Laptop | BDR-WDH | A3RQPM242 0004454 | HONR |
| | | | |
| | | | |
| | | | |

Note: The laptop is used to assist the RF test. In order to prevent the laptop from causing unnecessary impact on the test, the laptop will be removed from the test environment after the EUT successfully transmits at a fixed frequency using the laptop.

# 2 Summary of Test Result

| No. | Standard Section | Test Item | Result | Remark |
|---|---|---|---|---|
| 1 | 15.203 | Antenna requirement | Pass | |
| 2 | 15.207 | Conducted emission | Pass | |
| 3 | 15.247(d) | Band edge | Pass | |
| 4 | 15.205/15.209 | Spurious emission | Pass | |
| 5 | 15.247(b)(1) | Peak output power | Pass | |
| 6 | 15.247(a)(1) | 20dB occupied bandwidth | Pass | |
| 7 | 15.247(a)(1) | Carrier Frequencies Separation | Pass | |
| 8 | 15.247(a)(1) | Hopping channel number | Pass | |
| 9 | 15.247(a)(1) | Dwell time | Pass | |
| 10 | 15.247(d) | Spurious RF Conducted Emissions | Pass | |

# 3 Test Facilities and Accreditations

## 3.1 Test Laboratory

| | |
|---|---|
| Test Site | Shenzhen HongBiao Certification& Testing Co., Ltd |
| Test Site Location | Room 102, 201, Building 2, Yuanwanggu RFID Industrial Park, Tongguan Road, Tianliao Community, Yutang Street, Guangming District, Shenzhen, China |
| Telephone: | (86-755) 2998 9321 |
| Fax: | (86-755) 2998 5110 |
| FCC Registration No.: | CN1341 |
| A2LA Certificate No.: | 6765.01 |

## 3.2 Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

| | |
|---|---|
| Temperature: | 15ºC~35ºC |
| Relative Humidity: | 20%~75% |
| Air Pressure: | 98kPa~101kPa |

## 3.3 Measurement Uncertainty

The reported uncertainty of measurement y ± U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.
The data and results quoted in this document are true and accurate values, and uncertainties are not involved in the calculations.
In addition, components and mass production processes that are similar to testing equipment may introduce additional deviations, and the manufacturer is solely responsible for the continued compliance of the equipment.

| Measurement Frequency Range | U, (dB) | Note |
|---|---|---|
| RF frequency | $2x\ 10^{-5}$ | |
| RF power, conducted | ± 0.57 dB | |
| Conducted emission(150kHz~30MHz) | ± 2.5 dB | |
| Radiated emission(9kHz-30MHz) | ± 2.5 dB | |
| Radiated emission(30MHz~1GHz) | ± 4.2 dB | |
| Radiated emission (above 1GHz) | ± 4.7 dB | |
| Occupied Bandwidth | ±3% | |
| Temperature | ±1 degree | |
| Humidity | ± 5 % | |

## 3.4 Test Software

| Software name | Manufacturer | Model | Version |
|---|---|---|---|
| Conducted Emission test Software | Farad | EZ-EMC | EMC-CON 3A1.1+ |
| Radiated Emission test Software | Farad | EZ-EMC | FA-03A2 |
| RF Test System | MWRF | MTS 8310 | 2.0.0.0 |

# 4 List of Test Equipment

| Radiation emission | | | | | | | |
|---|---|---|---|---|---|---|---|
| Item | Equipment No. | Equipment name | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | HB-E001 | Horn Antenna | Schwarzbeck | BBHA 9120D | 02592 | 2024-05-18 | 2026-05-17 |
| 2 | HB-E002 | Biconical log-periodic composite antenna | Schwarzbeck | VULB 9168 | 01340 | 2024-05-18 | 2026-05-17 |
| 3 | HB-E003 | SHF-EHF Horn | Schwarzbeck | BBHA 91270 | 01193 | 2024-05-18 | 2026-05-17 |
| 4 | HB-E005 | Preamplifier | Noyetec | LAN-0118 | NYCM1420102 | 2024-05-17 | 2025-05-16 |
| 5 | HB-E006 | Preamplifier | Noyetec | LAN-1840 | NYCM1420103 | 2024-05-17 | 2025-05-16 |
| 6 | HB-E007 | EMI TEST RECEIVER | R&S | ESR7 | 102520 | 2024-05-17 | 2025-05-16 |
| 7 | HB-E009 | POSITINAL COTROLLER | Noyetec | N/A | N/A | / | / |
| 8 | HB-E013 | RF switch | Noyetec | NY-RF4 | NY0CM1420204 | / | / |
| 9 | HB-E066 | Illuminance Tester | TASI | TA8121 | N/A | 2024-05-21 | 2025-05-20 |
| 10 | HB-E075 | Active loop antenna | Schwarzbeck | FMZB 1519B | 1519B-245 | 2024-05-18 | 2026-05-17 |
| 11 | HB-E076 | Preamplifier | Hewlett Packard | 8447D | 1937A02278 | 2024-05-17 | 2025-05-16 |
| Conduction emission | | | | | | | |
| Item | Equipment No. | Equipment name | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | HB-E014 | 4 Path V-LISN | Schwarzbeck | NNLK 8121 | 00770 | 2024-05-17 | 2025-05-16 |
| 2 | HB-E015 | Pulse Limiter | Schwarzbeck | VTSD 9561-F | 00949 | 2024-05-17 | 2025-05-16 |
| 3 | HB-E016 | ZN23201 | Noyetec | ZN23201 | N/A | 2024-05-21 | 2025-05-20 |
| 4 | HB-E059 | Attenuator | Xianghua | TS2-6-1 | 220215166 | 2024-05-17 | 2025-05-16 |
| 5 | HB-E069 | EMI TEST RECEIVER | R&S | ESCI | N/A | 2024-05-17 | 2025-05-16 |

| RF | | | | | | | |
|---|---|---|---|---|---|---|---|
| Item | Equipment No. | Equipment name | Manufacturer | Model | Serial No. | Calibration date | Due date |
| 1 | HB-E041 | MXG Anaiog Signal Generator | Agilent | N5181A | MY47070421 | 2024-05-17 | 2025-05-16 |
| 2 | HB-E042 | WIDEBAND RADIO COMMUNICA | R&S | CMW500 | 132108 | 2024-05-17 | 2025-05-16 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | TION TESTER | | | | | |
| 3 | HB-E043 | MXG Anaiog Signal Generator | Agilent | N5182A | US46240335 | 2024-05-17 | 2025-05-16 |
| 4 | HB-E044 | Signal& spectrum Analyzer | R&S | FSV3044 | 101264 | 2024-05-17 | 2025-05-16 |
| 5 | HB-E045 | RF Control Box | Noyetec | NY100-R FCB | N/A | / | / |
| 6 | HB-E058 | Thermometer Clock Humidity Monitor | N/A | HTC-1 | N/A | / | / |

Note: the calibration interval of the above test instruments is 12&24 months and the calibrations are traceable to international system unit (SI).

# 5 Test Item And Results

## 5.1 Antenna Requirement

### 5.1.1 Standard Requirement

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device

### 5.1.2 Test Result

The EUT antenna is Ceramic Antenna. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

## 5.2 Conducted Emission

### 5.2.1 Limits

| Limits – Class B | | |
|---|---|---|
| Frequency (MHz) | Limit (dBμV) | |
| | Quasi-Peak | Average |
| 0.15 to 0.5 | 66 to 56* | 56 to 46* |
| 0.5 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

Note:
1. the tighter limit applies at the band edges.
2. the limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

### 5.2.2 Test Procedures

a) EUT Operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

b) The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---|---|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |

c) The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

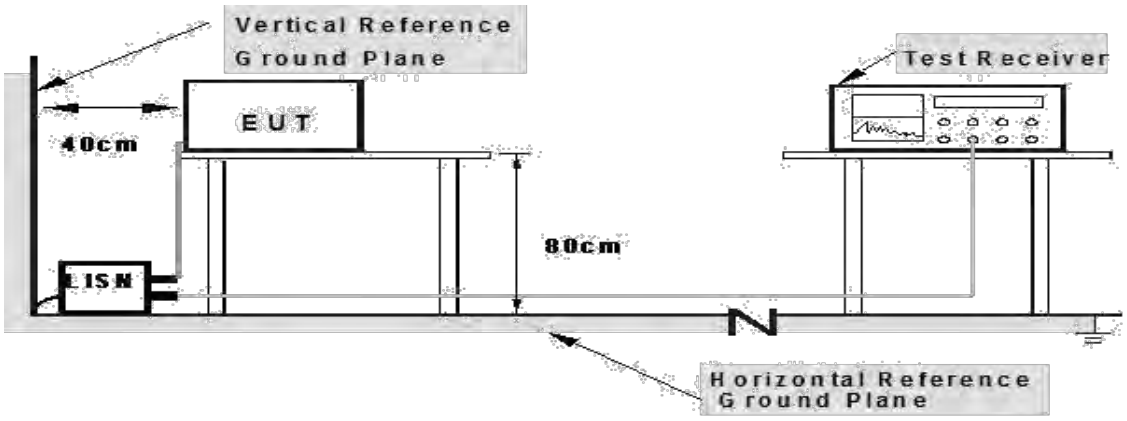
d) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

e) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

f) LISN is at least 80 cm from nearest part of EUT chassis.

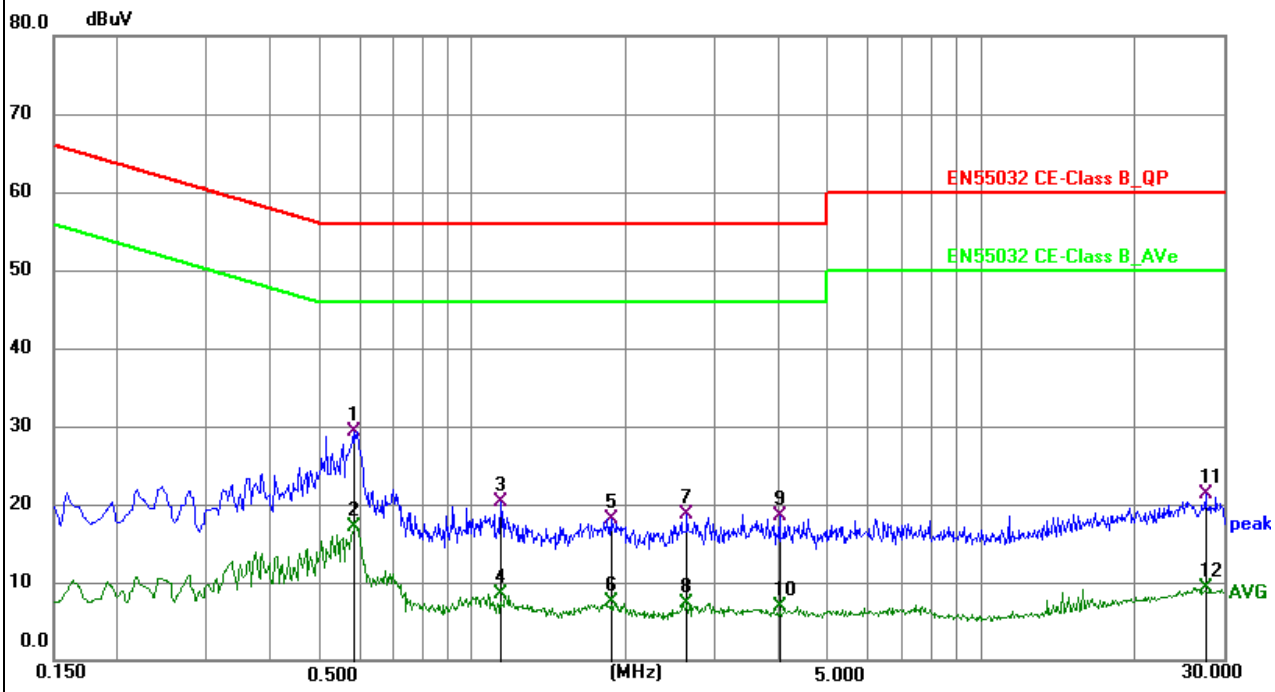
g) For the actual test configuration, please refer to the related Item – photographs of the test setup.

### 5.2.3 Test Setup



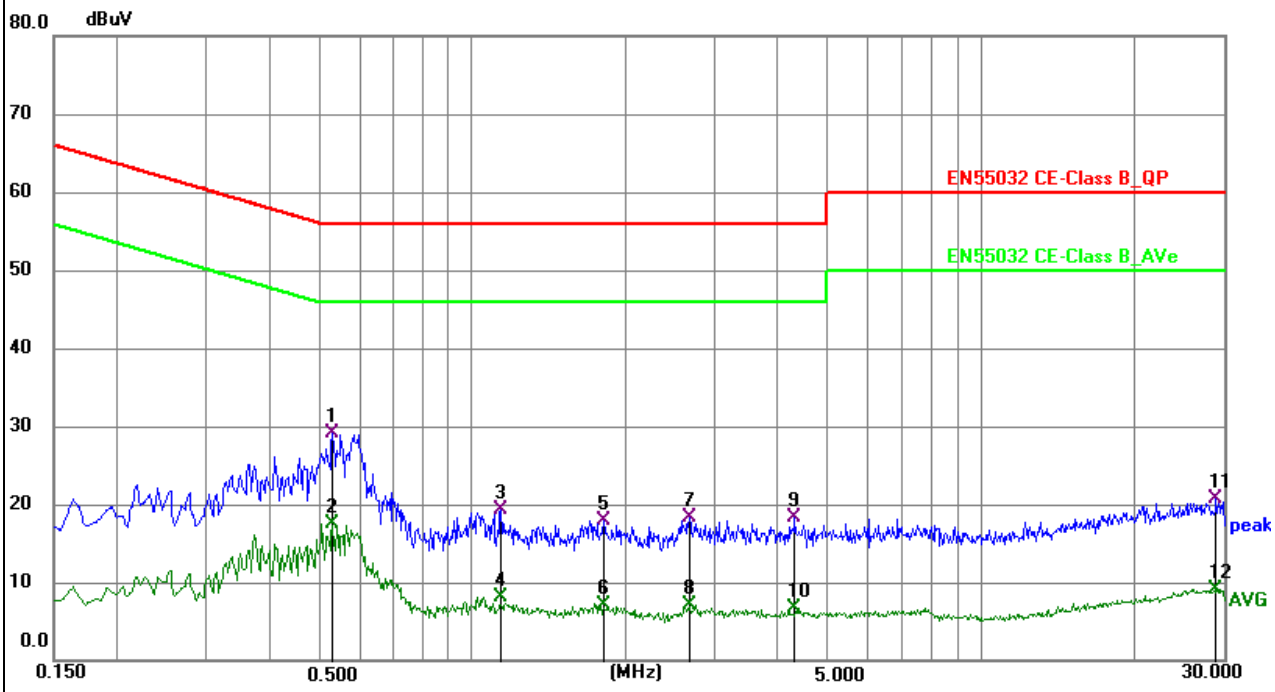

### 5.2.4 Test Result

| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Test Mode: | Charging | Phase: | L |
| Test Voltage: | DC 5V from adapter AC 120V/60Hz | | |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 * | 0.582000 | 18.75 | 10.50 | 29.25 | 56.00 | -26.75 | QP |
| 2 | 0.582000 | 6.67 | 10.50 | 17.17 | 46.00 | -28.83 | AVG |
| 3 | 1.140000 | 9.85 | 10.43 | 20.28 | 56.00 | -35.72 | QP |
| 4 | 1.140000 | -1.88 | 10.43 | 8.55 | 46.00 | -37.45 | AVG |
| 5 | 1.873500 | 7.71 | 10.47 | 18.18 | 56.00 | -37.82 | QP |
| 6 | 1.873500 | -3.01 | 10.47 | 7.46 | 46.00 | -38.54 | AVG |
| 7 | 2.638500 | 8.15 | 10.51 | 18.66 | 56.00 | -37.34 | QP |
| 8 | 2.638500 | -3.27 | 10.51 | 7.24 | 46.00 | -38.76 | AVG |
| 9 | 4.006500 | 8.07 | 10.42 | 18.49 | 56.00 | -37.51 | QP |
| 10 | 4.006500 | -3.52 | 10.42 | 6.90 | 46.00 | -39.10 | AVG |
| 11 | 27.676500 | 8.29 | 12.98 | 21.27 | 60.00 | -38.73 | QP |
| 12 | 27.676500 | -3.65 | 12.98 | 9.33 | 50.00 | -40.67 | AVG |

| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Test Mode: | Charging | Phase: | N |
| Test Voltage: | DC 5V from adapter AC 120V/60Hz | | |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 * | 0.528000 | 18.78 | 10.40 | 29.18 | 56.00 | -26.82 | QP |
| 2 | 0.528000 | 7.05 | 10.40 | 17.45 | 46.00 | -28.55 | AVG |
| 3 | 1.135500 | 8.89 | 10.35 | 19.24 | 56.00 | -36.76 | QP |
| 4 | 1.135500 | -2.21 | 10.35 | 8.14 | 46.00 | -37.86 | AVG |
| 5 | 1.810500 | 7.49 | 10.34 | 17.83 | 56.00 | -38.17 | QP |
| 6 | 1.810500 | -3.14 | 10.34 | 7.20 | 46.00 | -38.80 | AVG |
| 7 | 2.674500 | 7.88 | 10.41 | 18.29 | 56.00 | -37.71 | QP |
| 8 | 2.674500 | -3.30 | 10.41 | 7.11 | 46.00 | -38.89 | AVG |
| 9 | 4.303400 | 7.96 | 10.34 | 18.30 | 56.00 | -37.70 | QP |
| 10 | 4.303400 | -3.55 | 10.34 | 6.79 | 46.00 | -39.21 | AVG |
| 11 | 29.004000 | 7.73 | 12.98 | 20.71 | 60.00 | -39.29 | QP |
| 12 | 29.004000 | -3.80 | 12.98 | 9.18 | 50.00 | -40.82 | AVG |

## 5.3 Radiated Emission

### 5.3.1 Limits

| Frequencies (MHz) | Field Strength (micorvolts/meter) | Measurement Distance (meters) |
|---|---|---|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

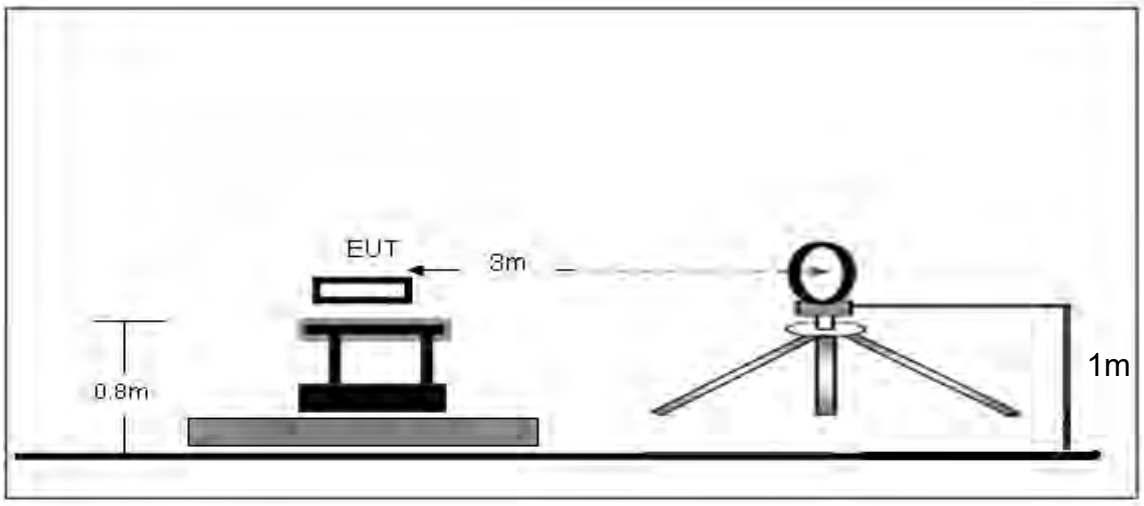
| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

### 5.3.2 Test Procedures

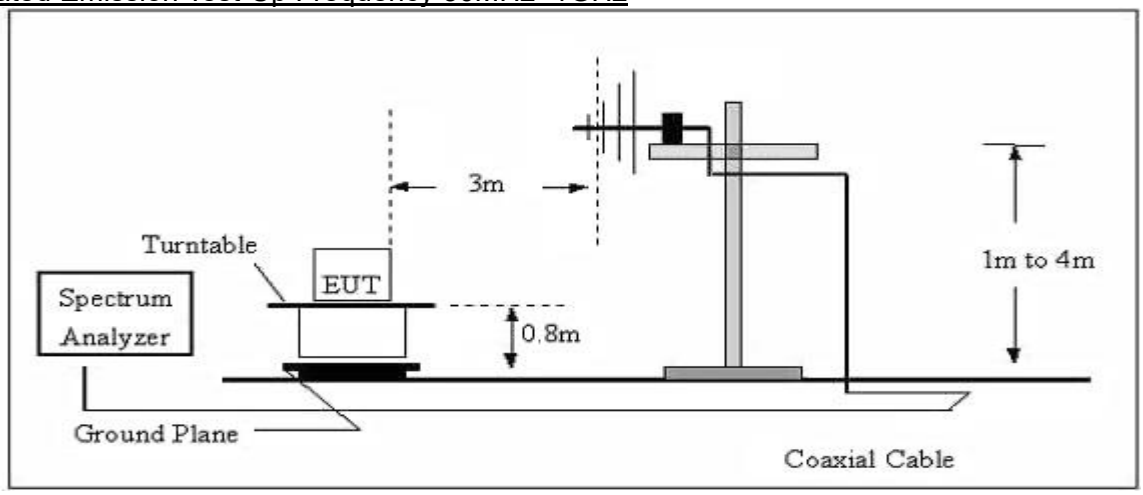
a) The radiated emission tests were performed in the 3 meters.
b) The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
c) The height of the test antenna shall vary between 1m to 4m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d) If the peak mode measured value compliance with and lower than quasi peak mode limit, the EUT shall be deemed to meet QP limits and then no additional QP mode measurement performed.
e) If the peak mode measured value compliance with and lower than average mode limit, the EUT shall be deemed to meet average limits and then no additional average mode measurement performed.
f) For the actual test configuration, please refer to the related item – EUT test photos.

### 5.3.3 Test Setup

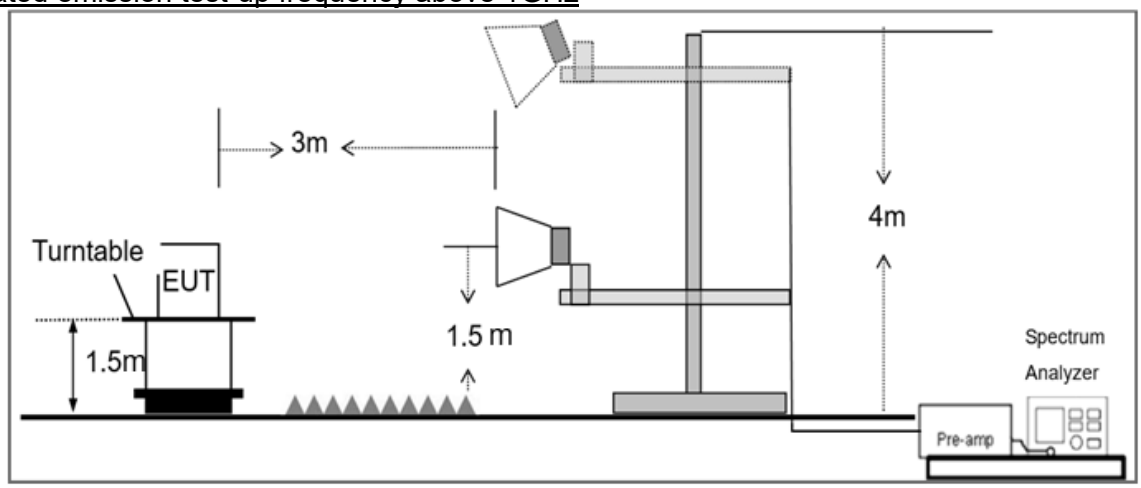
Radiated Emission Test-Up Frequency Below 30MHz




Radiated Emission Test-Up Frequency 30MHz~1GHz




Radiated emission test-up frequency above 1GHz




### 5.3.4 Test Result

Below 30MHz

| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Pressure: | 1010 hPa | Test Voltage: | DC 3.7V from battery |
| Test Mode: | TX | Polarization: | -- |

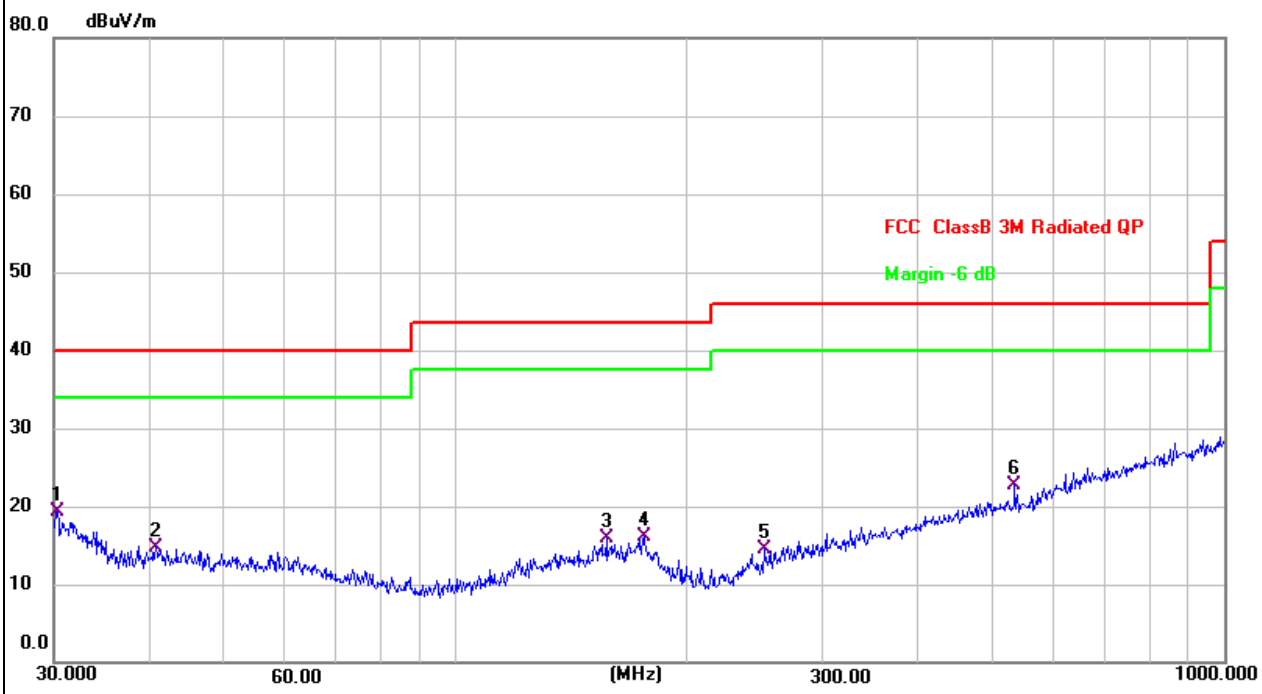
| Freq. | Reading | Limit | Margin | State |
|---|---|---|---|---|
| (MHz) | (dBuV/m) | (dBuV/m) | (dB) | P/F |
| -- | -- | -- | -- | Pass |
| -- | -- | -- | -- | Pass |

Note:

1. For 9kHz-30MHz, the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
2. Distance extrapolation factor =40 log (specific distance/test distance)(dB);
3. Limit line = specific limits (dBuV) + distance extrapolation factor.

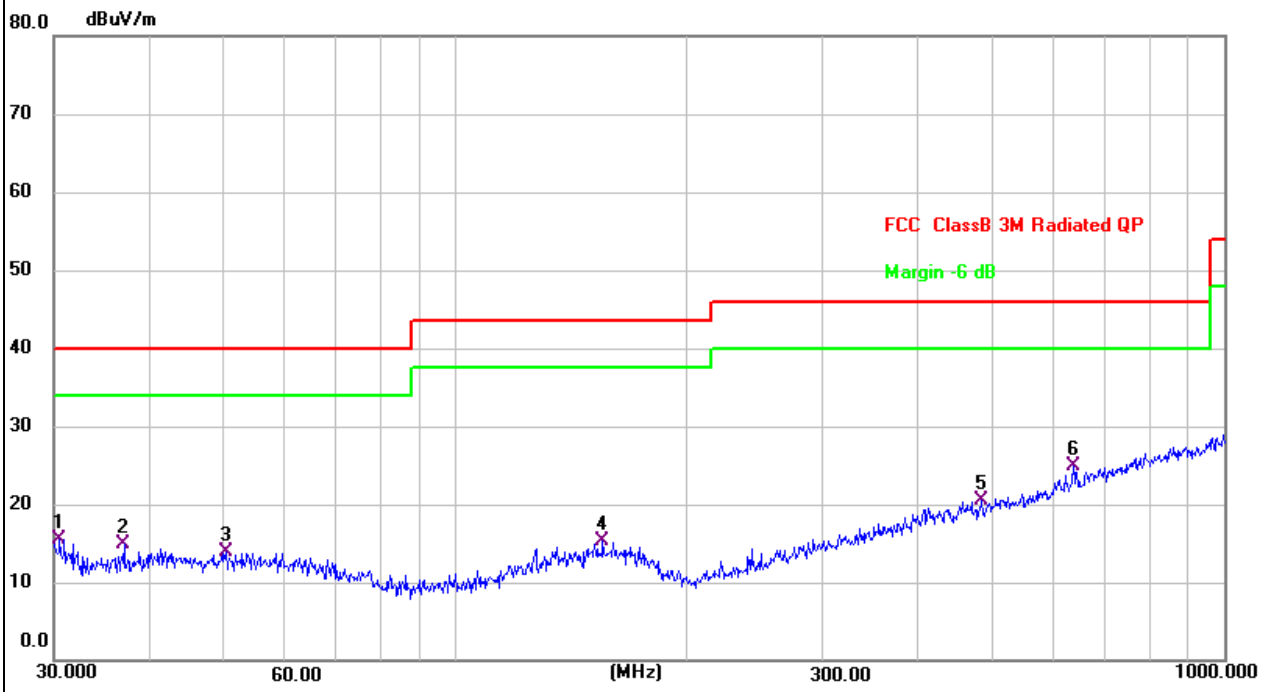
30MHz – 1GHz

| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Test Mode: | TX | Phase: | Vertical |
| Test Voltage: | DC 3.7V from battery | | |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 * | 30.3173 | 34.59 | -15.31 | 19.28 | 40.00 | -20.72 | QP |
| 2 | 40.7016 | 28.80 | -14.00 | 14.80 | 40.00 | -25.20 | QP |
| 3 | 157.0074 | 29.20 | -13.32 | 15.88 | 43.50 | -27.62 | QP |
| 4 | 175.6516 | 30.63 | -14.52 | 16.11 | 43.50 | -27.39 | QP |
| 5 | 252.0627 | 29.21 | -14.69 | 14.52 | 46.00 | -31.48 | QP |
| 6 | 533.8321 | 29.36 | -6.74 | 22.62 | 46.00 | -23.38 | QP |

| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Test Mode: | TX | Phase: | Horizontal |
| Test Voltage: | DC 3.7V from battery | | |




| No. | Frequency (MHz) | Reading (dBuV) | Factor (dB/m) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|---|---|---|---|---|---|---|---|
| 1 | 30.5306 | 30.69 | -15.28 | 15.41 | 40.00 | -24.59 | QP |
| 2 | 37.0248 | 29.27 | -14.39 | 14.88 | 40.00 | -25.12 | QP |
| 3 | 50.2324 | 28.24 | -14.29 | 13.95 | 40.00 | -26.05 | QP |
| 4 | 155.3644 | 28.31 | -13.08 | 15.23 | 43.50 | -28.27 | QP |
| 5 | 483.9094 | 28.33 | -7.77 | 20.56 | 46.00 | -25.44 | QP |
| 6 * | 636.1340 | 28.54 | -3.71 | 24.83 | 46.00 | -21.17 | QP |

1GHz-25GHz

| Frequency (MHz) | Read Level (dBμV) | Cable loss (dB) | Antenna Factor (dB/m) | Preamp Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type | Comment |
|---|---|---|---|---|---|---|---|---|---|
| Low Channel (2402 MHz)(GFSK)--Above 1G | | | | | | | | | |
| 4804.125 | 42.98 | 4.83 | 33.5 | 30.80 | 50.51 | 74.00 | -23.49 | Pk | Vertical |
| 4804.125 | 31.80 | 4.83 | 33.5 | 30.80 | 39.33 | 54.00 | -14.67 | AV | Vertical |
| 7206.261 | 42.93 | 5.83 | 37.79 | 31.40 | 55.15 | 74.00 | -18.85 | Pk | Vertical |
| 7206.261 | 31.89 | 5.83 | 37.79 | 31.40 | 44.11 | 54.00 | -9.89 | AV | Vertical |
| 4804.194 | 43.01 | 4.83 | 33.5 | 30.80 | 50.54 | 74.00 | -23.46 | Pk | Horizontal |
| 4804.194 | 31.91 | 4.83 | 33.5 | 30.80 | 39.44 | 54.00 | -14.56 | AV | Horizontal |
| 7206.274 | 42.63 | 5.83 | 37.79 | 31.40 | 54.85 | 74.00 | -19.15 | Pk | Horizontal |
| 7206.274 | 31.90 | 5.83 | 37.79 | 31.40 | 44.12 | 54.00 | -9.88 | AV | Horizontal |
| Mid Channel (2441 MHz)(GFSK)--Above 1G | | | | | | | | | |
| 4882.139 | 44.22 | 4.89 | 33.76 | 30.80 | 52.07 | 74.00 | -21.93 | Pk | Vertical |
| 4882.139 | 32.02 | 4.89 | 33.76 | 30.80 | 39.87 | 54.00 | -14.13 | AV | Vertical |
| 7323.284 | 44.29 | 5.95 | 38.25 | 31.70 | 56.79 | 74.00 | -17.21 | Pk | Vertical |
| 7323.284 | 32.77 | 5.95 | 38.25 | 31.70 | 45.27 | 54.00 | -8.73 | AV | Vertical |
| 4882.215 | 43.88 | 4.89 | 33.76 | 30.80 | 51.73 | 74.00 | -22.27 | Pk | Horizontal |
| 4882.215 | 31.81 | 4.89 | 33.76 | 30.80 | 39.66 | 54.00 | -14.34 | AV | Horizontal |
| 7323.299 | 44.10 | 5.95 | 38.25 | 31.70 | 56.60 | 74.00 | -17.40 | Pk | Horizontal |
| 7323.299 | 32.84 | 5.95 | 38.25 | 31.70 | 45.34 | 54.00 | -8.66 | AV | Horizontal |
| High Channel (2480 MHz)(GFSK)-- Above 1G | | | | | | | | | |
| 4960.143 | 42.76 | 4.95 | 34.33 | 30.80 | 51.24 | 74.00 | -22.76 | Pk | Vertical |
| 4960.143 | 32.07 | 4.95 | 34.33 | 30.80 | 40.55 | 54.00 | -13.45 | AV | Vertical |
| 7440.296 | 43.48 | 6.11 | 37.60 | 31.74 | 55.45 | 74.00 | -18.55 | Pk | Vertical |
| 7440.296 | 32.24 | 6.11 | 37.60 | 31.74 | 44.21 | 54.00 | -9.79 | AV | Vertical |
| 4960.245 | 42.71 | 4.95 | 34.33 | 30.80 | 51.19 | 74.00 | -22.81 | Pk | Horizontal |
| 4960.245 | 32.00 | 4.95 | 34.33 | 30.80 | 40.48 | 54.00 | -13.52 | AV | Horizontal |
| 7440.304 | 43.27 | 6.11 | 37.60 | 31.74 | 55.24 | 74.00 | -18.76 | Pk | Horizontal |
| 7440.304 | 32.29 | 6.11 | 37.60 | 31.74 | 44.26 | 54.00 | -9.74 | AV | Horizontal |

Note:

1. All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
2. Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor.
3. All the modulation modes have been tested, and only the worst results are reflected in the report.

### 5.3.5 Radiated Band Edge

| Frequency (MHz) | Read Level (dBμV) | Cable loss (dB) | Antenna Factor (dB/m) | Preamp Factor (dB) | Emission Level (dBμV/m) | Limits (dBμV/m) | Margin (dB) | Detector Type | Comment |
|---|---|---|---|---|---|---|---|---|---|
| 1Mbps (GFSK)- Non-hopping | | | | | | | | | |
| 2310.00 | 45.94 | 3.40 | 27.80 | 32.41 | 44.73 | 74 | -29.27 | Pk | Horizontal |
| 2310.00 | 33.33 | 3.40 | 27.80 | 32.41 | 32.12 | 54 | -21.88 | AV | Horizontal |
| 2310.00 | 44.68 | 3.40 | 27.80 | 32.41 | 43.47 | 74 | -30.53 | Pk | Vertical |
| 2310.00 | 33.73 | 3.40 | 27.80 | 32.41 | 32.52 | 54 | -21.48 | AV | Vertical |
| 2390.00 | 45.72 | 3.45 | 27.70 | 32.49 | 44.38 | 74 | -29.62 | Pk | Vertical |
| 2390.00 | 34.37 | 3.45 | 27.70 | 32.49 | 33.03 | 54 | -20.97 | AV | Vertical |
| 2390.00 | 46.28 | 3.45 | 27.70 | 32.49 | 44.94 | 74 | -29.06 | Pk | Horizontal |
| 2390.00 | 34.61 | 3.45 | 27.70 | 32.49 | 33.27 | 54 | -20.73 | AV | Horizontal |
| 2400.00 | 46.59 | 3.46 | 27.80 | 32.54 | 45.31 | 74 | -28.69 | Pk | Vertical |
| 2400.00 | 34.37 | 3.46 | 27.80 | 32.54 | 33.09 | 54 | -20.91 | AV | Vertical |
| 2400.00 | 45.93 | 3.46 | 27.80 | 32.54 | 44.65 | 74 | -29.35 | Pk | Horizontal |
| 2400.00 | 34.28 | 3.46 | 27.80 | 32.54 | 33.00 | 54 | -21.00 | AV | Horizontal |
| 2483.50 | 47.22 | 3.48 | 28.53 | 32.55 | 46.68 | 74 | -27.32 | Pk | Vertical |
| 2483.50 | 34.00 | 3.48 | 28.53 | 32.55 | 33.46 | 54 | -20.54 | AV | Vertical |
| 2483.50 | 46.35 | 3.48 | 28.53 | 32.55 | 45.81 | 74 | -28.19 | Pk | Horizontal |
| 2483.50 | 33.77 | 3.48 | 28.53 | 32.55 | 33.23 | 54 | -20.77 | AV | Horizontal |
| 2500.00 | 45.52 | 3.49 | 29.20 | 32.66 | 45.55 | 74 | -28.45 | Pk | Vertical |
| 2500.00 | 33.73 | 3.49 | 29.20 | 32.66 | 33.76 | 54 | -20.24 | AV | Vertical |
| 2500.00 | 45.26 | 3.49 | 29.20 | 32.66 | 45.29 | 74 | -28.71 | Pk | Horizontal |
| 2500.00 | 33.76 | 3.49 | 29.20 | 32.66 | 33.79 | 54 | -20.21 | AV | Horizontal |
| 1Mbps (GFSK)- hopping | | | | | | | | | |
| 2400.00 | 46.88 | 3.46 | 27.80 | 32.54 | 45.60 | 74 | -28.40 | Pk | Vertical |
| 2400.00 | 34.66 | 3.46 | 27.80 | 32.54 | 33.38 | 54 | -20.62 | AV | Vertical |
| 2400.00 | 45.87 | 3.46 | 27.80 | 32.54 | 44.59 | 74 | -29.41 | Pk | Horizontal |
| 2400.00 | 34.77 | 3.46 | 27.80 | 32.54 | 33.49 | 54 | -20.51 | AV | Horizontal |
| 2483.50 | 47.25 | 3.48 | 28.53 | 32.55 | 46.71 | 74 | -27.29 | Pk | Vertical |
| 2483.50 | 34.21 | 3.48 | 28.53 | 32.55 | 33.67 | 54 | -20.33 | AV | Vertical |
| 2483.50 | 46.59 | 3.48 | 28.53 | 32.55 | 46.05 | 74 | -27.95 | Pk | Horizontal |
| 2483.50 | 34.03 | 3.48 | 28.53 | 32.55 | 33.49 | 54 | -20.51 | AV | Horizontal |

Note:

1. All Readings are Peak Value (VBW=3MHz) and AV Value (VBW=10Hz).
2. Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor.
3. All the modulation modes have been tested, and only the worst results are reflected in the report.

## 5.4 Peak Output Power

### 5.4.1 Limit

| FCC Part15 Subpart C | | | |
|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.247(b)(1) | Peak output power | Power<1W(30dBm) | 2400-2483.5 |

### 5.4.2 Test Procedure

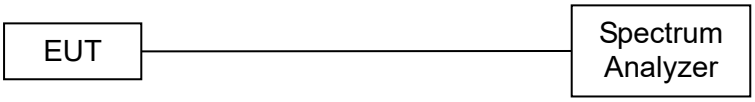
(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

(2) Spectrum Setting:

RBW=2MHz, VBW=10MHz, Detector=Peak

(3) The EUT was set to continuously transmitting in the max power during the test.

### 5.4.3 Test Setup




### 5.4.4 Test Results

| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Test Mode: | TX Mode/ CH00, CH39, CH78 | Test Voltage: | DC 3.7V from battery |

GFSK

| Test Channel | Frequency (MHz) | Maximum Peak Output Power(dBm) | Limit (dBm) |
|---|---|---|---|
| CH00 | 2402 | 1.77 | 21 |
| CH39 | 2441 | 1.38 | 21 |
| CH78 | 2480 | 1.72 | 21 |

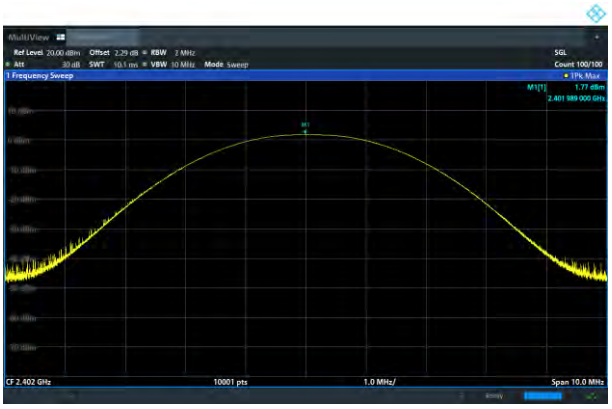
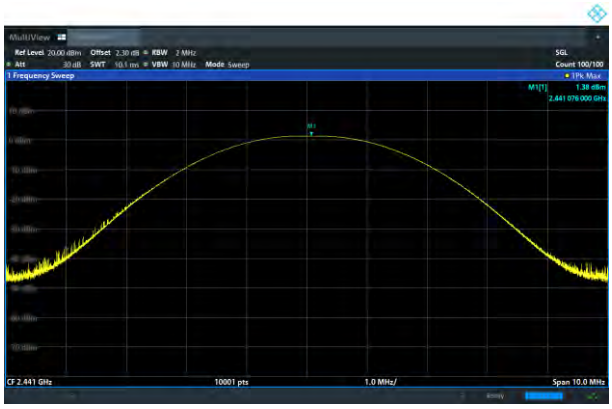
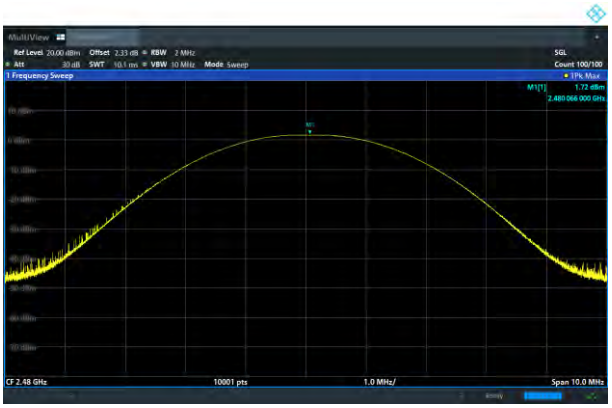
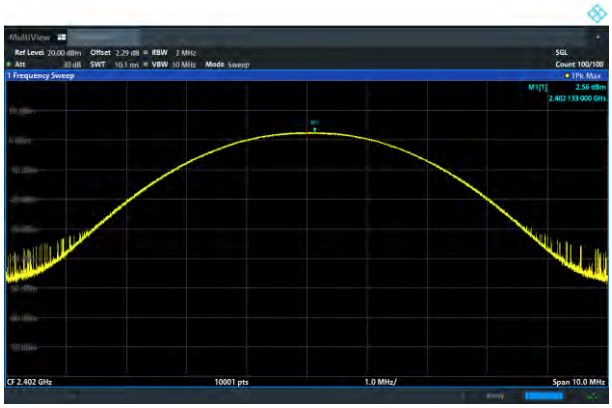
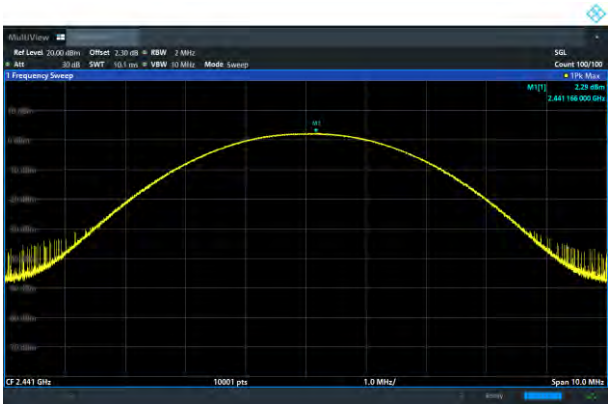
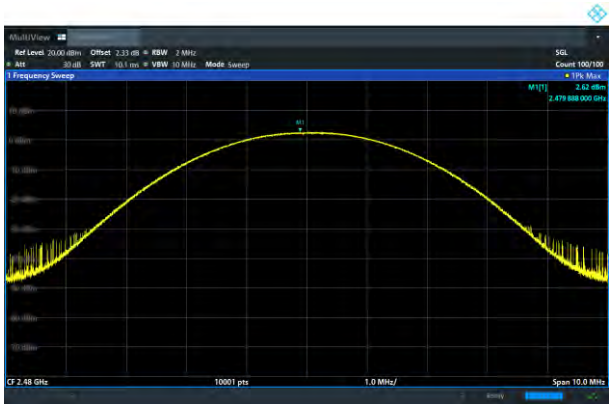
π/4-DQPSK

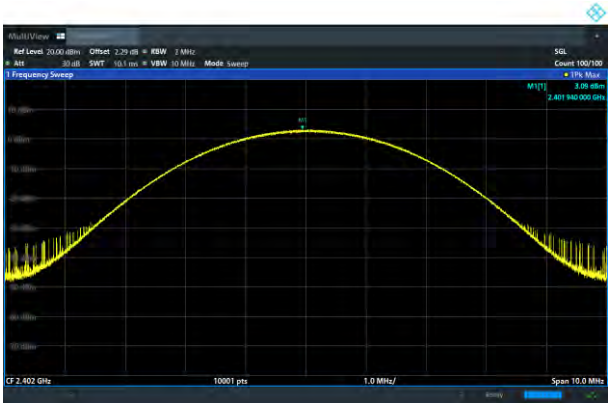
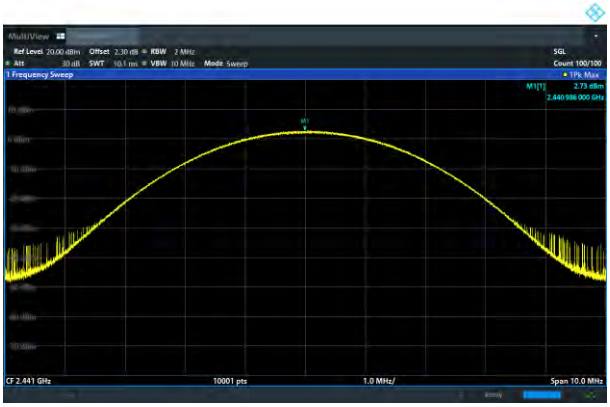
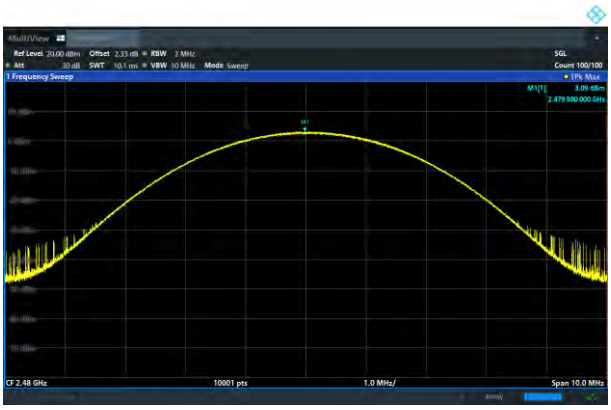
| Test Channel | Frequency (MHz) | Maximum Peak Output Power(dBm) | Limit (dBm) |
|---|---|---|---|
| CH00 | 2402 | 2.56 | 30 |
| CH39 | 2441 | 2.29 | 30 |
| CH78 | 2480 | 2.62 | 30 |

8DPSK

| Test Channel | Frequency (MHz) | Maximum Peak Output Power(dBm) | Limit (dBm) |
|---|---|---|---|
| CH00 | 2402 | 3.09 | 30 |
| CH39 | 2441 | 2.73 | 30 |
| CH78 | 2480 | 3.09 | 30 |

Test plots

| GFSK on Channel 00 | GFSK on Channel 39 |
|---|---|
|  |  |
| GFSK on Channel 78 | π/4-DQPSK on Channel 00 |
|  |  |
| π/4-DQPSK on Channel 39 | π/4-DQPSK on Channel 78 |
|  |  |

| 8DPSK on Channel 00 | 8DPSK on Channel 39 |
|---|---|
|  |  |
| 8DPSK on Channel 78 | / |
|  | / |

## 5.5 20dB Occupied Channel Bandwidth

### 5.5.1 Limit

| FCC Part15 (15.247) , Subpart C | | | |
|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.247a(1) | 20dB bandwidth | N/A | 2400-2483.5 |

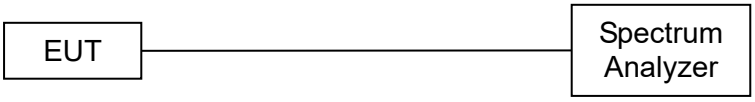
### 5.5.2 Test Procedure

(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

(2) Spectrum Setting:

Bandwidth: RBW=30 kHz, VBW=100 kHz, detector= Peak

### 5.5.3 Test Setup




### 5.5.4 Test results

| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Test Mode: | TX Mode/ CH00, CH39, CH78 | Test Voltage: | DC 3.7V from battery |

| Mode | Frequency (MHz) | 20dB Bandwidth (MHz) | Limit (kHz) | Result |
|---|---|---|---|---|
| GFSK | 2402 | 0.934 | N/A | Pass |
| | 2441 | 0.932 | N/A | Pass |
| | 2480 | 0.931 | N/A | Pass |
| π/4-DQPSK | 2402 | 1.261 | N/A | Pass |
| | 2441 | 1.232 | N/A | Pass |
| | 2480 | 1.265 | N/A | Pass |
| 8DPSK | 2402 | 1.248 | N/A | Pass |
| | 2441 | 1.254 | N/A | Pass |
| | 2480 | 1.246 | N/A | Pass |

Test plots

GFSK mode

TX CH00

TX CH39

TX CH78

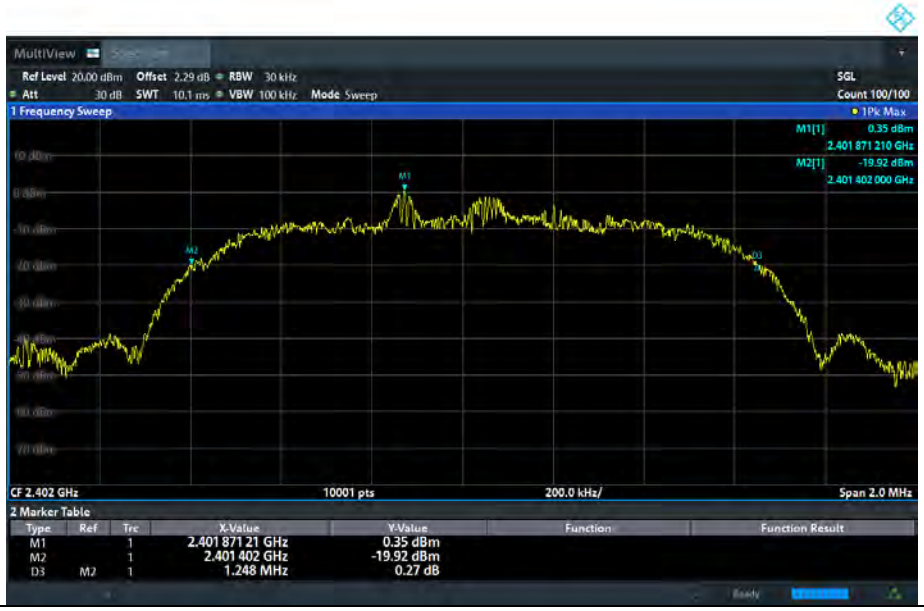
π/4-DQPSK

TX CH00

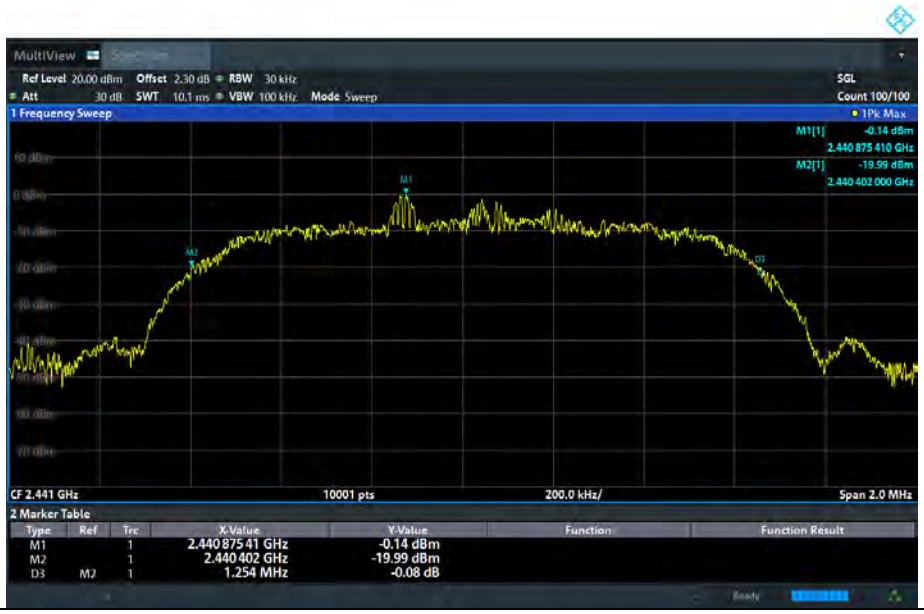
TX CH39

TX CH78

## 8DPSK mode

| TX CH00 |
|---|
|  |



| TX CH39 |
|---|
|  |

TX CH78

MultiView
Ref Level 20.00 dBm Offset 2.33 dB RBW 30 kHz
Att 30 dB SWT 10.1 ms VBW 100 kHz Mode Sweep
SGL
Count 100/100
1 Frequency Sweep
1Pk Max
M1[1] 0.49 dBm
2.479 871 410 GHz
M2[1] -19.42 dBm
2.479 403 000 GHz
CF 2.48 GHz
10001 pts
200.0 kHz/
Span 2.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.479 871 41 GHz 0.49 dBm
M2 1 2.479 403 GHz -19.42 dBm
D3 M2 1 1.246 MHz 0.04 dB

## 5.6 Carrier Frequency Separation

### 5.6.1 Limit

| FCC Part15 (15.247) , Subpart C | | | |
|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.247(a)(1) | Channel Separation | >25kHz or >two-thirds of the 20 dB bandwidth (Which is greater) | 2400-2483.5 |

### 5.6.2 Test Procedure

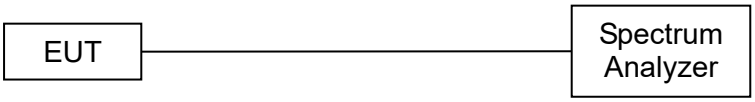
(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

(2) Spectrum Setting:

RBW=30 kHz, VBW=100 kHz, detector= Peak, Sweep Time =auto.

(3) The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Test.

### 5.6.3 Test Setup




### 5.6.4 Test Results

| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Pressure: | 1012 hPa | Test Voltage: | DC 3.7V from battery |
| Test Mode: | GFSK, π/4-DQPSK, 8DPSK /CH00, CH39, CH78 | | |

| Mode | Channel | Frequency (MHz) | Test Result (kHz) | Limit (kHz) | | Result |
|---|---|---|---|---|---|---|
| GFSK | Low | 2402 | 1000 | 934 | 20dB BW | Pass |
| | Middle | 2441 | 1006 | 932 | 20dB BW | Pass |
| | High | 2480 | 998 | 931 | 20dB BW | Pass |
| π/4-DQPSK | Low | 2402 | 1004 | 841 | 2/3 of 20dB BW | Pass |
| | Middle | 2441 | 994 | 821 | 2/3 of 20dB BW | Pass |
| | High | 2480 | 1006 | 843 | 2/3 of 20dB BW | Pass |
| 8DPSK | Low | 2402 | 1002 | 832 | 2/3 of 20dB BW | Pass |
| | Middle | 2441 | 1002 | 836 | 2/3 of 20dB BW | Pass |
| | High | 2480 | 1000 | 831 | 2/3 of 20dB BW | Pass |

Test plots

GFSK mode-CH00

GFSK mode-CH39

GFSK mode-CH78

π/4-DQPSK mode-CH00

π/4-DQPSK mode-CH39

π/4-DQPSK mode-CH78

8DPSK mode-CH00

8DPSK mode-CH39

8DPSK mode-CH78

## 5.7 Hopping Channel Number

### 5.7.1 Limit

Frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

### 5.7.2 Test Procedure

The testing follows IEEE / ANSI C63.10-2020 clause 7.8.3

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously.

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW : To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

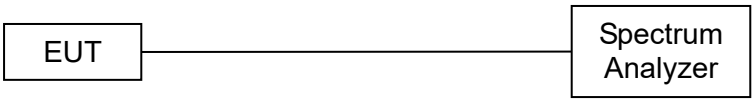
VBW ≥ RBW

Sweep = auto

Detector function = peak

Trace = max hold

### 5.7.3 Test Setup




### 5.7.4 Test Results

| Mode | Quantity of Hopping Channel | Limit | Results |
|---|---|---|---|
| GFSK, π/4-DQPSK, 8DPSK | 79 | >15 | Pass |

Test plots

GFSK mode

π/4-DQPSK mode

| 8DPSK mode |
| --- |
| |

MultiView
Ref Level 20.00 dBm Offset 2.29 dB RBW 100 kHz
Att 30 dB SWT 1.01 ms VBW 300 kHz Mode Sweep
1 Frequency Sweep
1Pk Max
M1[1] 1.42 dBm
2.401 837 0 GHz
M2[1] 1.08 dBm
2.480 243 5 GHz
M1
2.4 GHz
1001 pts
8.35 MHz/
2.483 5 GHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.401 837 GHz 1.42 dBm
M2 1 2.480 243 5 GHz 1.08 dBm
Measuring...

## 5.8 Dwell Time

### 5.8.1 Limit

| FCC Part15 (15.247) , Subpart C | | | |
|---|---|---|---|
| Section | Test Item | Limit | Frequency Range (MHz) |
| 15.247(a)(1) | Dwell time | 0.4 sec | 2400-2483.5 |

### 5.8.2 Test Procedure

(1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.

(2) Spectrum Setting: RBW=1MHz, VBW=3MHz, Span=0Hz, Detector=Peak

(3) Use video trigger with the trigger level set to enable triggering only on full pulses.

(4) Sweep Time is more than once pulse time.

(5) Set the center frequency on any frequency would be measure and set the frequency span to zero span.

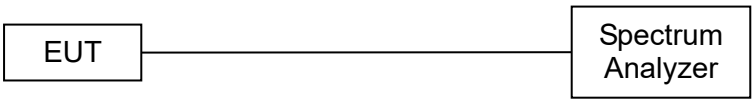
(6) Measure the maximum time duration of one single pulse.

(7) Set the EUT for packet transmitting.

(8) Measure the maximum time duration of one single pulse.

(9) The EUT was set to the Hopping Mode for Dwell Time Test.

### 5.8.3 Test Setup



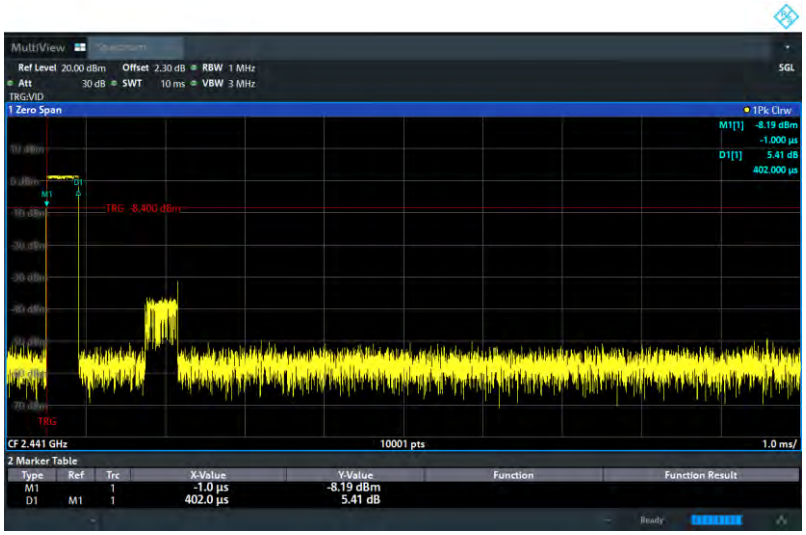

### 5.8.4 Test Results

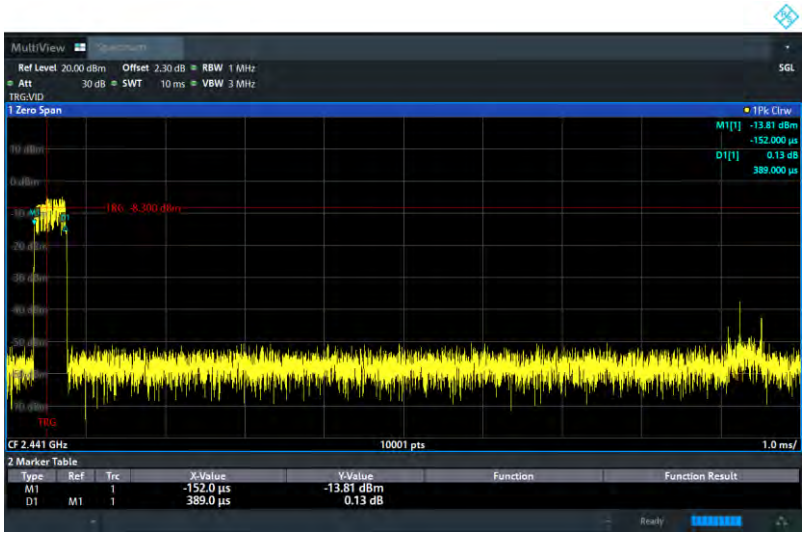
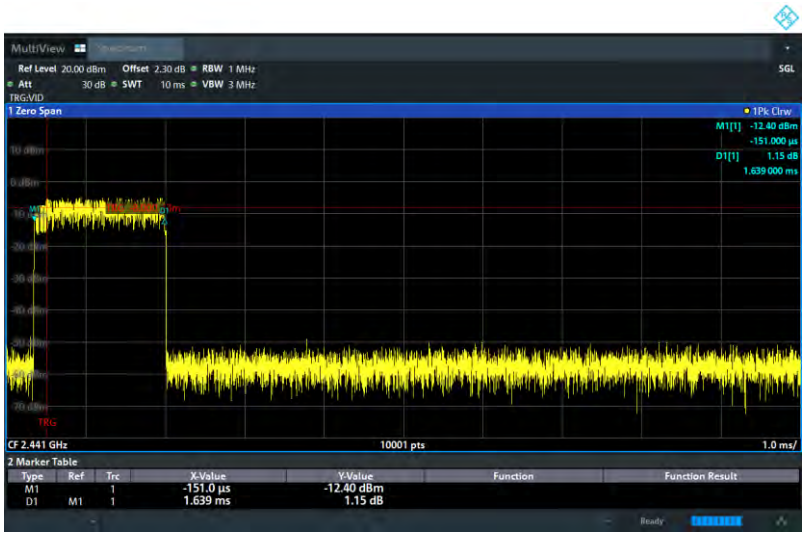
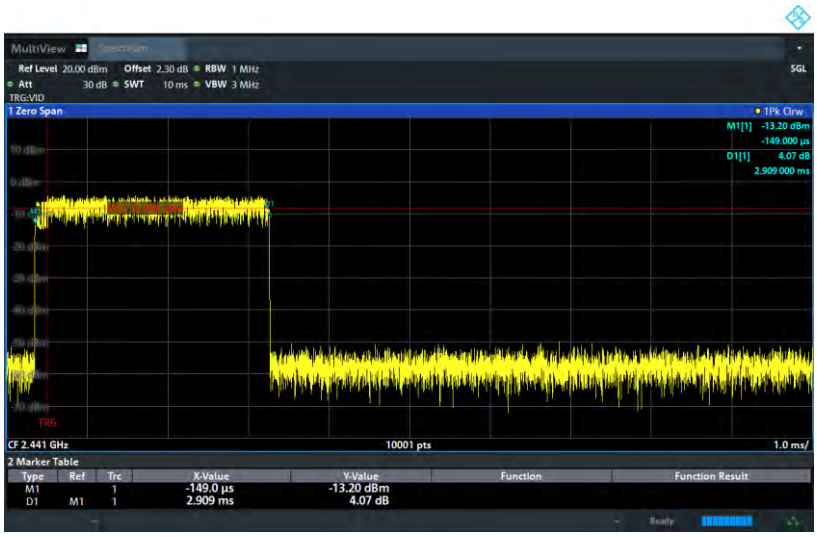
| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Pressure: | 1012 hPa | Test Voltage: | DC 3.7V from battery |
| Test Mode: | GFSK, π/4-DQPSK, 8DPSK /CH39 | | |

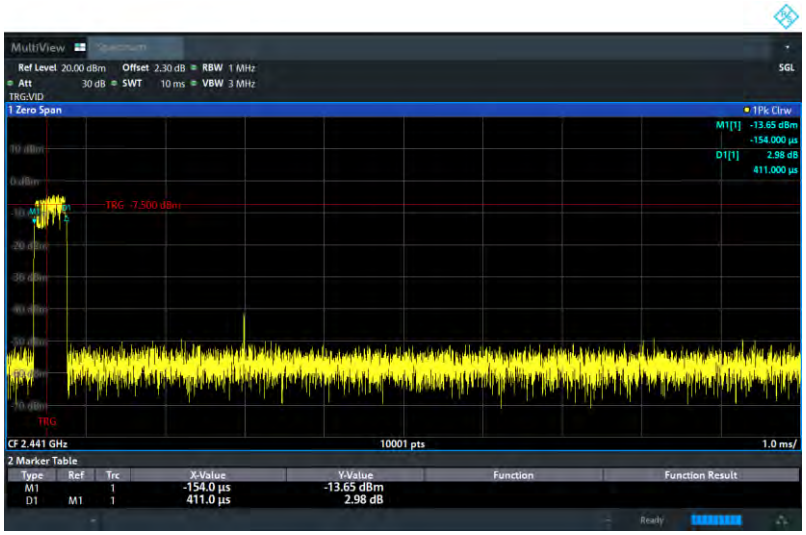
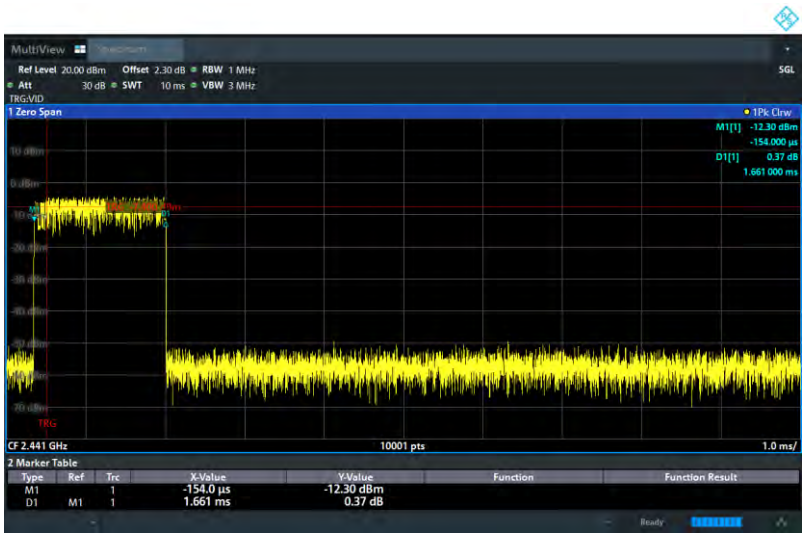
| Mode | Data Packet | Frequency (MHz) | Pulse Duration (ms) | Dwell Time (ms) | Limit(s) | Conclusion |
|---|---|---|---|---|---|---|
| GFSK | DH1 | 2441 | 0.402 | 128.238 | <0.4 | Pass |
| | DH3 | 2441 | 1.658 | 258.648 | <0.4 | Pass |
| | DH5 | 2441 | 2.906 | 325.472 | <0.4 | Pass |
| π/4 DQPSK | 2DH1 | 2441 | 0.389 | 124.091 | <0.4 | Pass |
| | 2DH3 | 2441 | 1.639 | 265.518 | <0.4 | Pass |
| | 2DH5 | 2441 | 2.909 | 305.445 | <0.4 | Pass |
| 8DPSK | 3DH1 | 2441 | 0.411 | 131.109 | <0.4 | Pass |
| | 3DH3 | 2441 | 1.661 | 272.404 | <0.4 | Pass |
| | 3DH5 | 2441 | 2.912 | 299.936 | <0.4 | Pass |

Note:
1.A period time = 0.4 (s) * 79 = 31.6(s)
2.DH1 time slot = Pulse Duration * (1600/(2*79)) * A period time
DH3 time slot = Pulse Duration * (1600/(4*79)) * A period time
DH5 time slot = Pulse Duration * (1600/(6*79)) * A period time
3. For GFSK, π/4-DQPSK and 8DPSK: The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test plots

| Modulation mode | GFSK mode |
|---|---|
| DH1 |  |
| DH3 | |
| DH5 | |

| Modulation mode | π/4-DQPSK mode |
|---|---|
| 2-DH1 |  |
| 2-DH3 |  |
| 2-DH5 |  |

| Modulation mode | 8DPSK mode |
|---|---|
| 3-DH1 |  |
| 3-DH3 |  |
| 3-DH5 | |

## 5.9 Conducted Band Edge

### 5.9.1 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### 5.9.2 Test Procedure

a) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

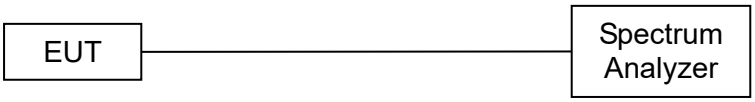
b) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.

c) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.

d) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

e) Repeat above procedures until all measured frequencies were complete.

### 5.9.3 Test Setup

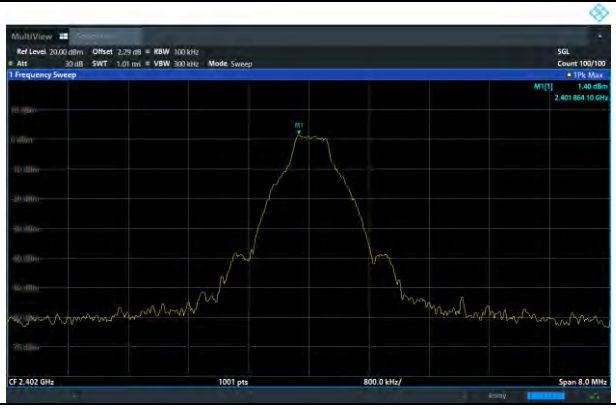


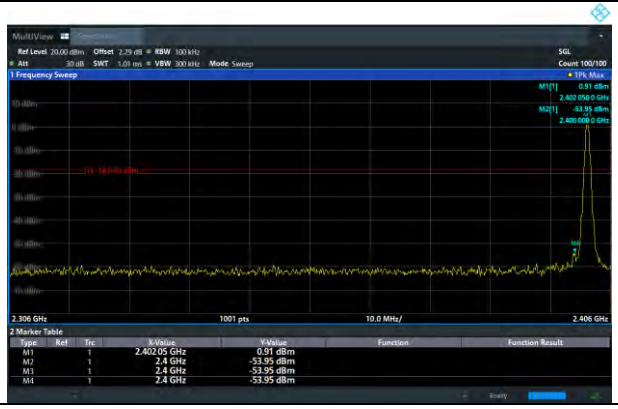

### 5.9.4 Test Results

| | | | |
|---|---|---|---|
| EUT: | Open Wireless Headset | Model Name: | JC-01 |
| Pressure: | 1012 hPa | Test Voltage: | DC 3.7V from battery |

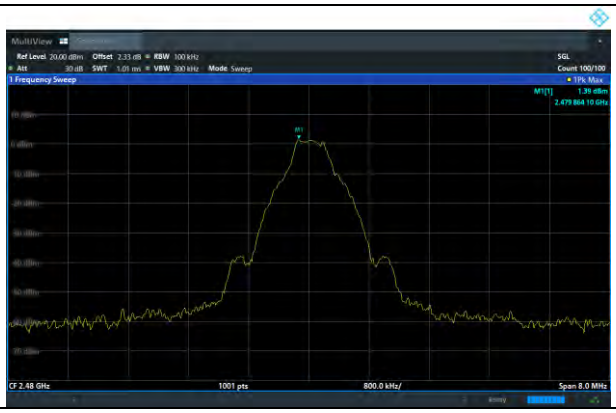
Test plots

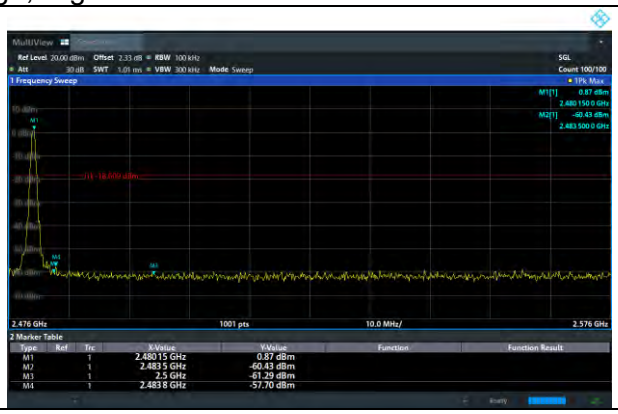
GFSK: Band Edge, Left Side



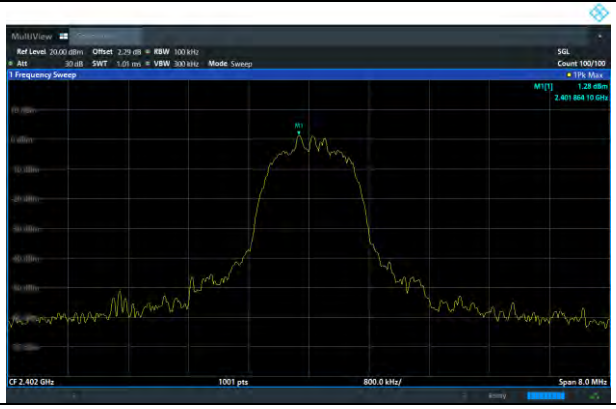



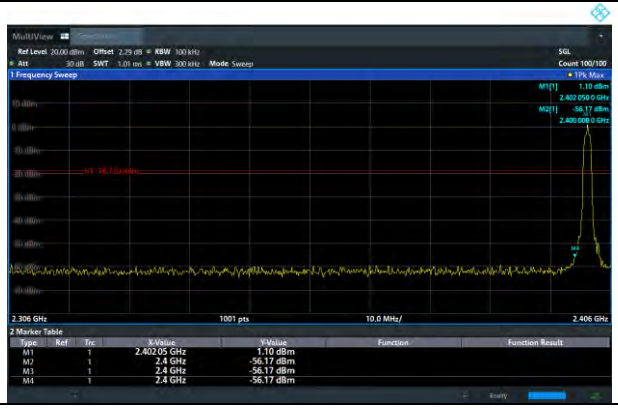

GFSK: Band Edge, Right Side



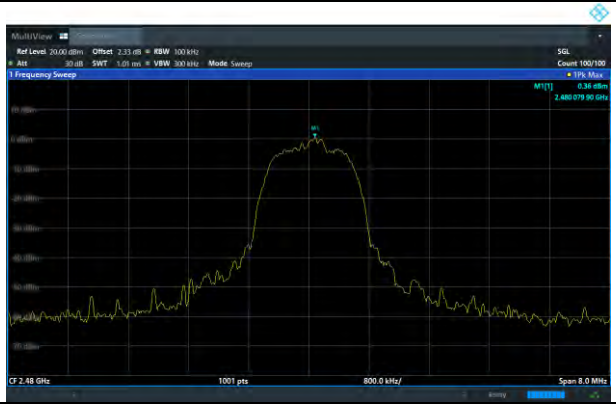



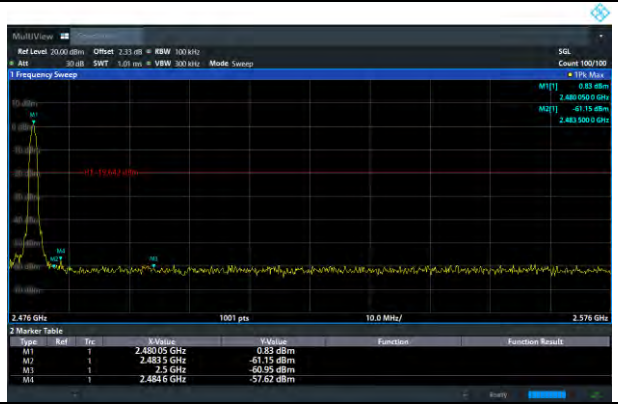
π/4-DQPSK: Band Edge, Left Side



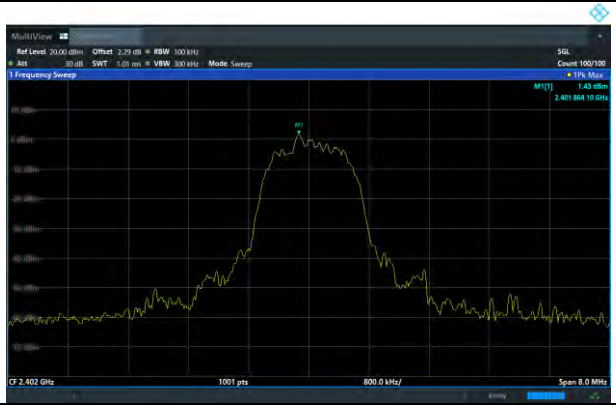



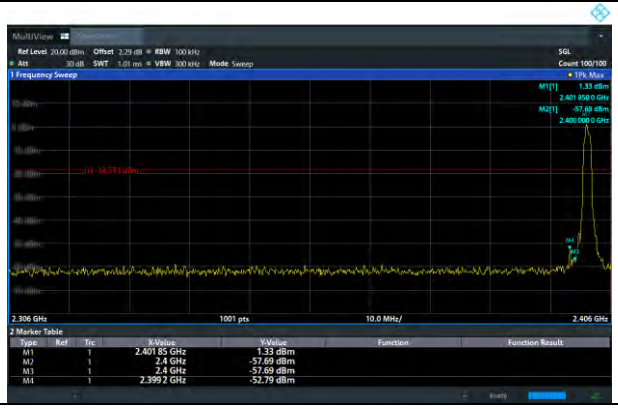

π/4-DQPSK: Band Edge, Right Side



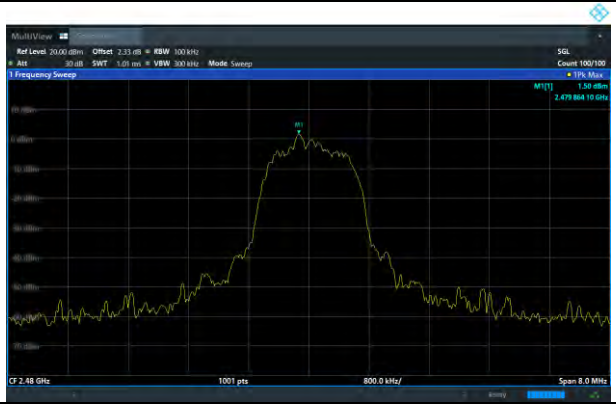



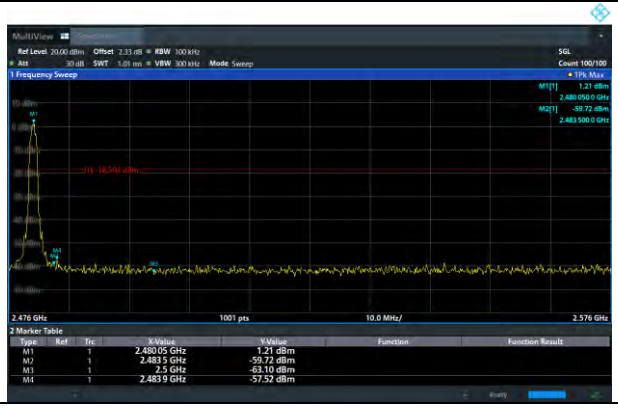
8DPSK: Band Edge, Left Side




8DPSK: Band Edge, Right Side

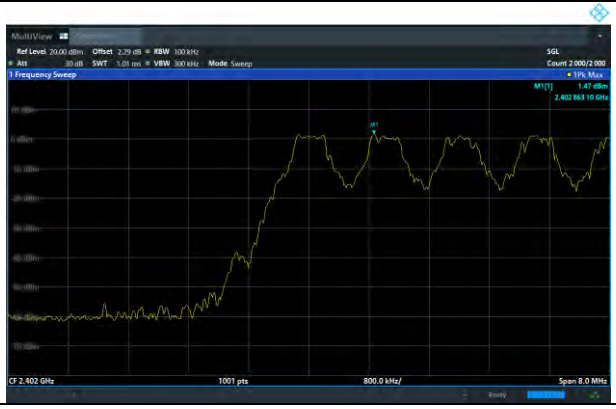


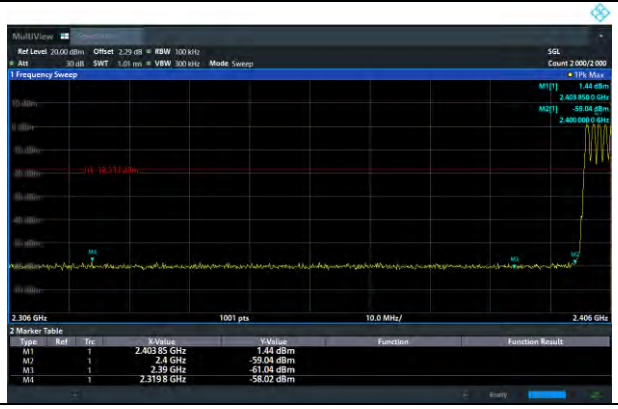



Hopping Mode

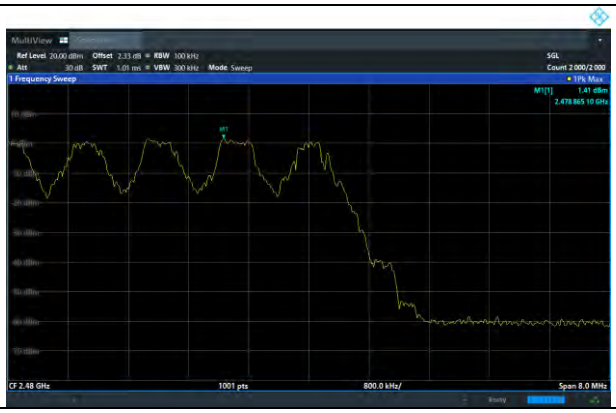
Test plots

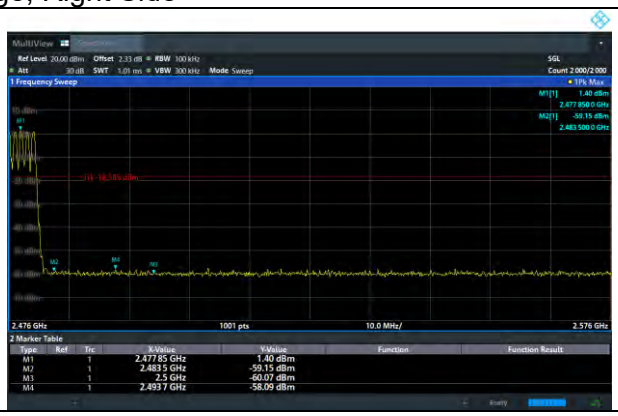
GFSK: Band Edge, Left Side



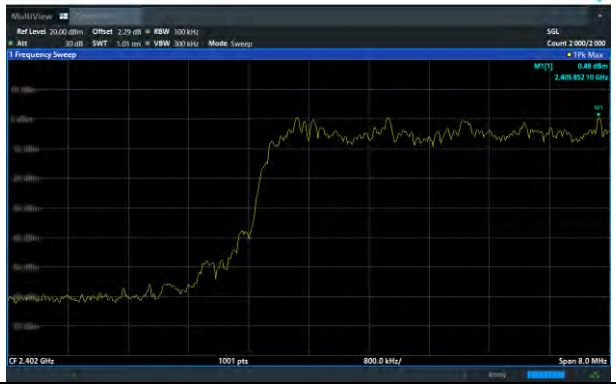



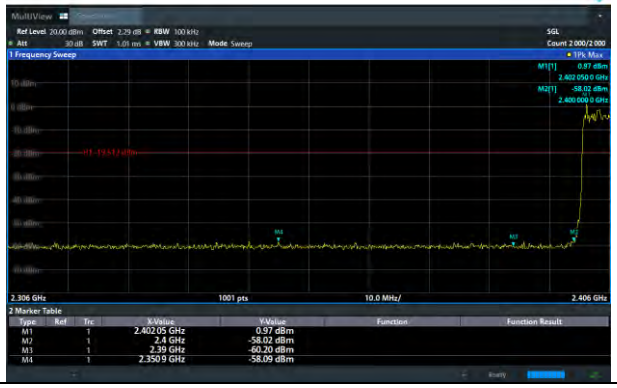

GFSK: Band Edge, Right Side



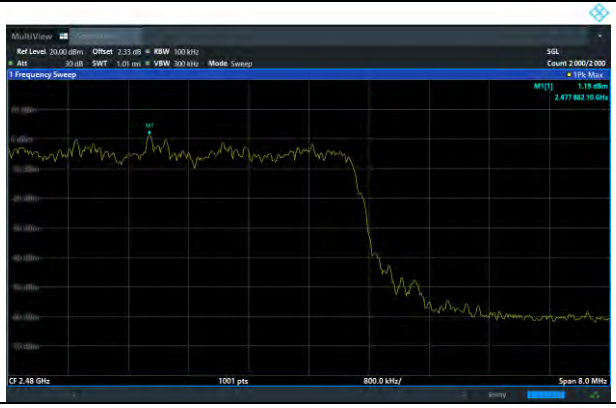



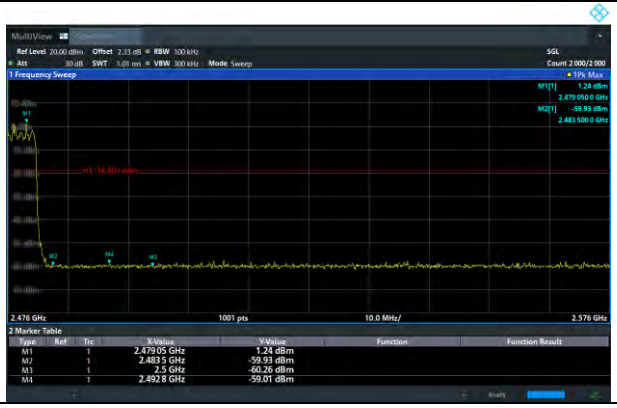
π/4-DQPSK: Band Edge, Left Side



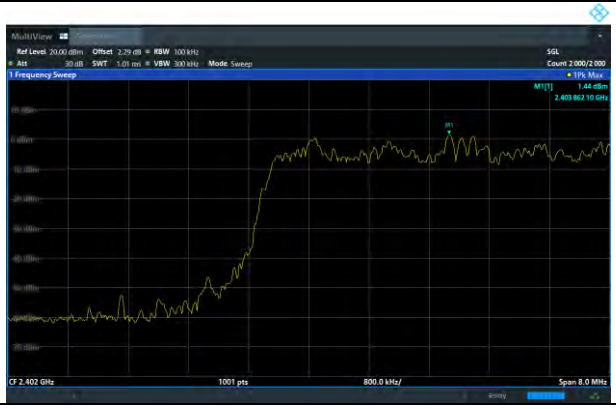



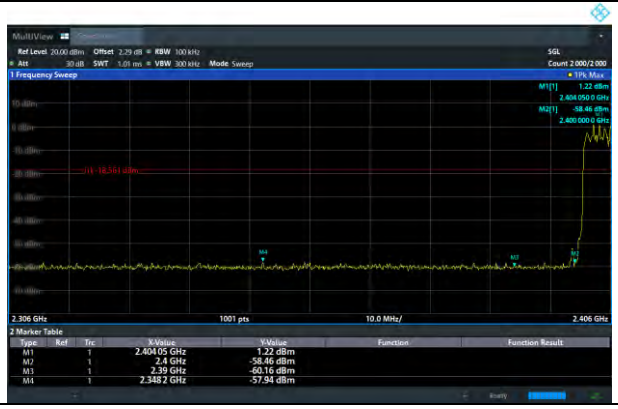

π/4-DQPSK: Band Edge, Right Side



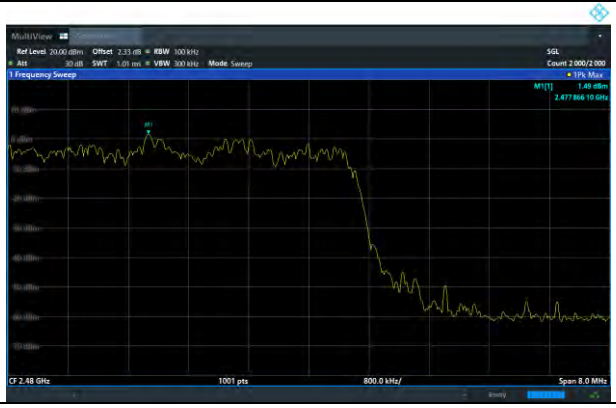



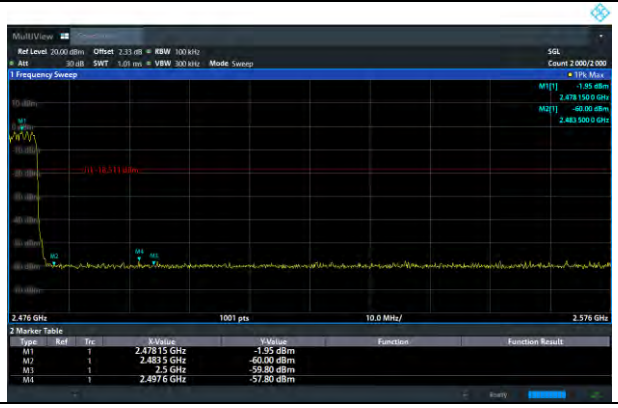
8DPSK: Band Edge, Left Side




8DPSK: Band Edge, Right Side



## 5.10 Spurious RF Conducted Emissions

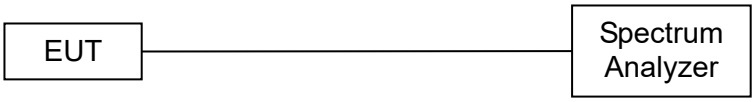
### 5.10.1 Limit

Below -20dB of the highest emission level in operating band.

### 5.10.2 Test Procedure

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2020 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=100kHz and VBW= 300kHz to measure the peak field strength, and measure frequency range from 9kHz to 26.5GHz.

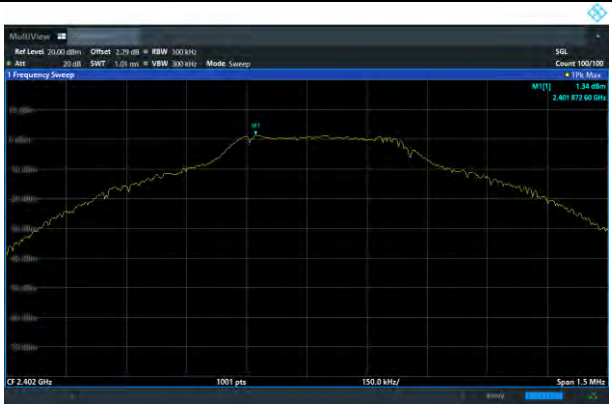
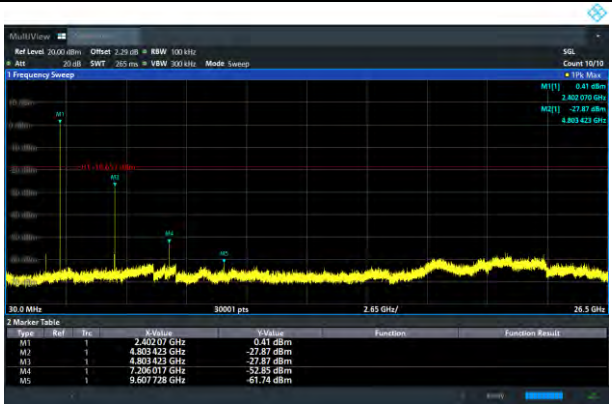
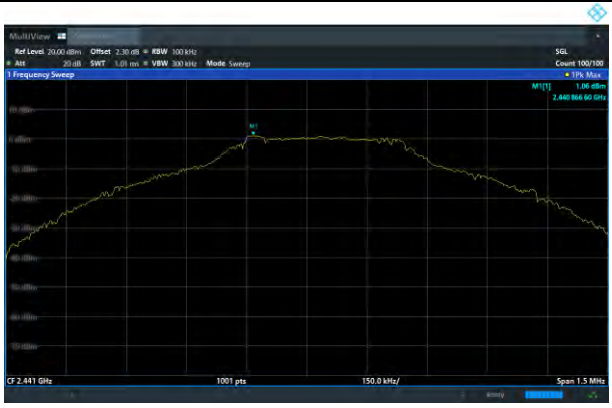
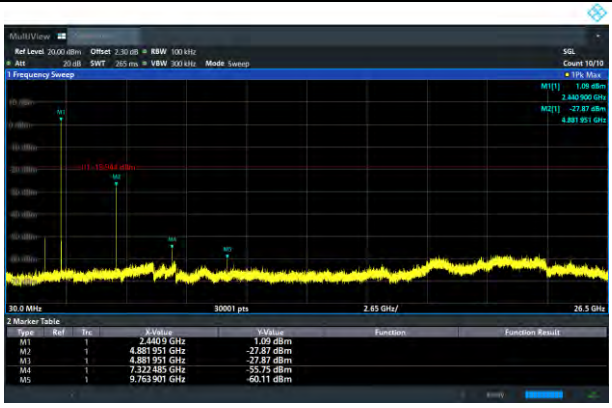
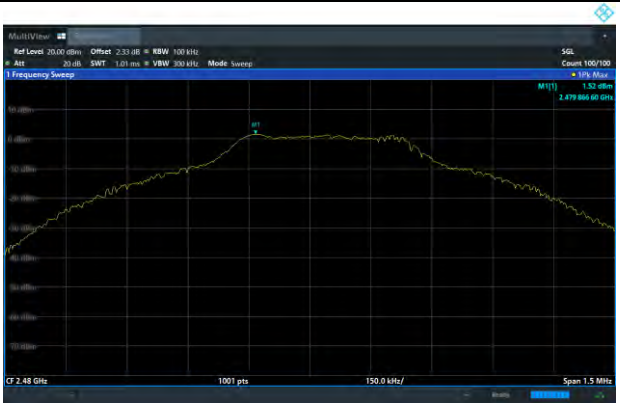
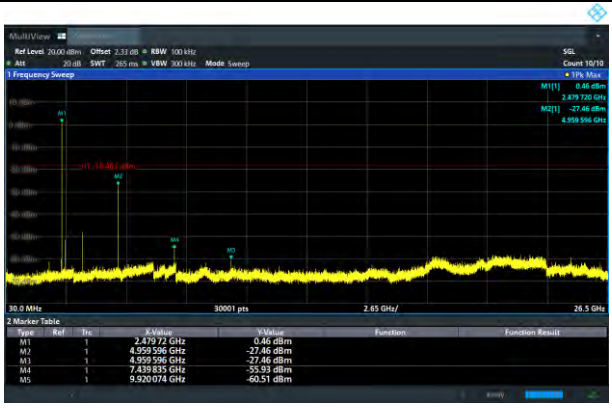
### 5.10.3 Test Setup



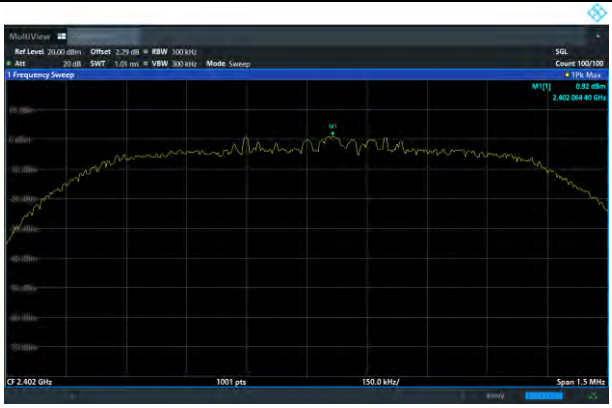

### 5.10.4 Test Results

Note:

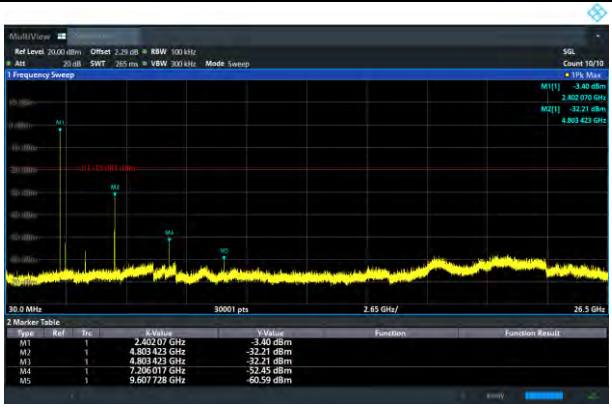
1: The measurement frequency range is from 9kHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and band edge measurement data.

| GFSK on Channel 00 | GFSK on Channel 00 |
|---|---|
|  |  |
| **GFSK on Channel 39** | **GFSK on Channel 39** |
|  |  |
| **GFSK on Channel 78** | **GFSK on Channel 78** |
|  |  |

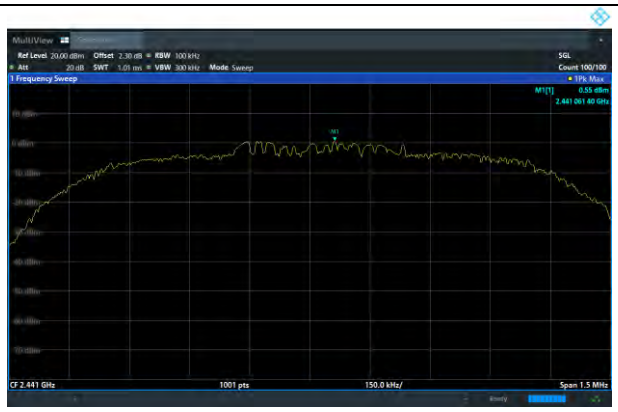
π/4-DQPSK on Channel 00



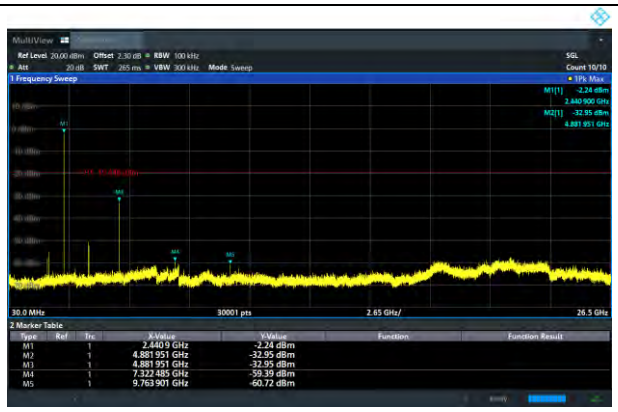

π/4-DQPSK on Channel 00



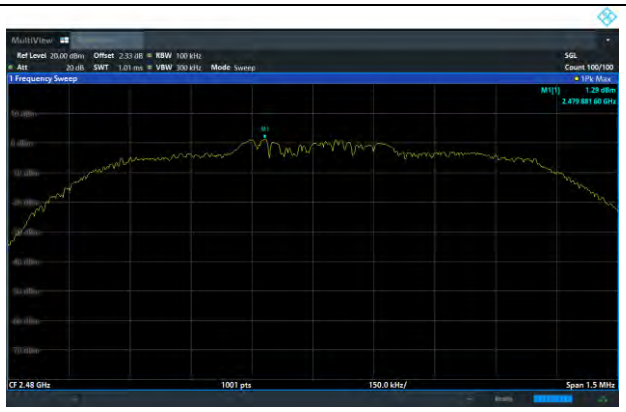

π/4-DQPSK on Channel 39



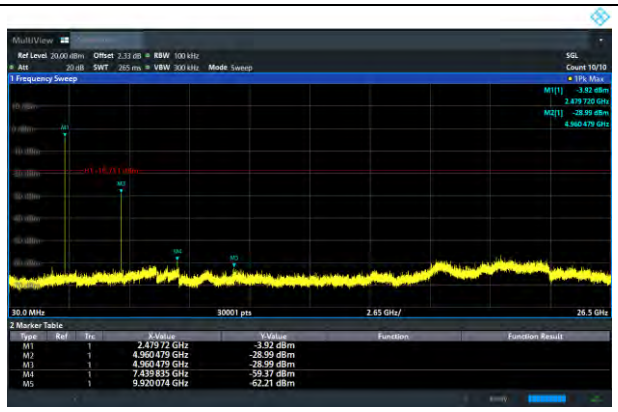

π/4-DQPSK on Channel 39

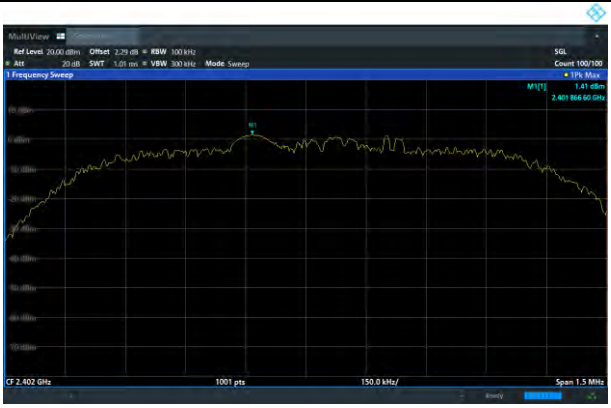
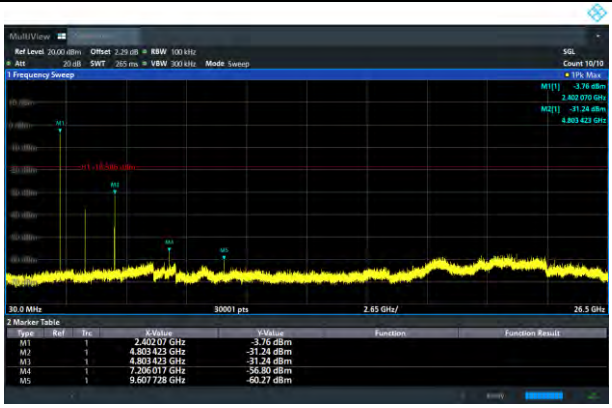
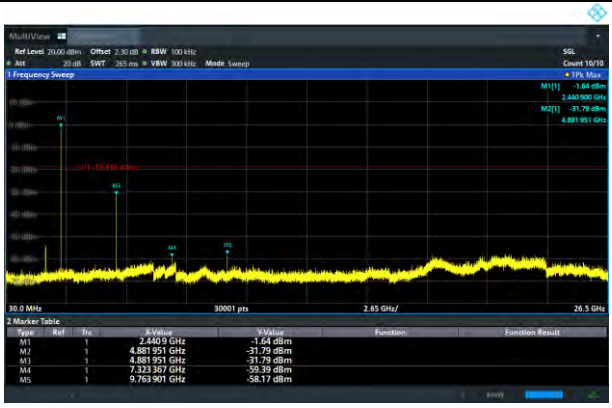
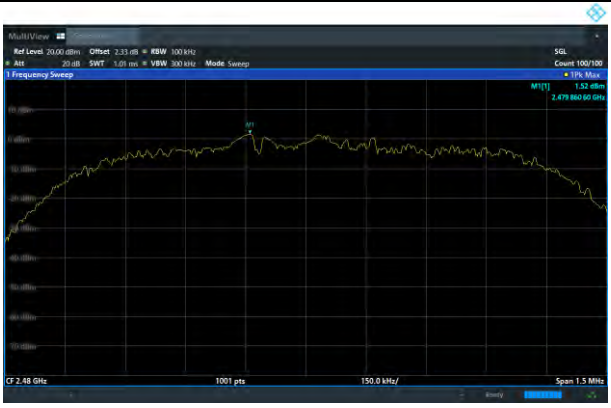
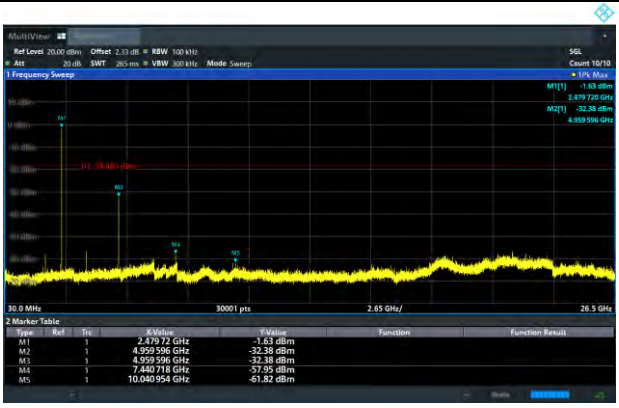



π/4-DQPSK on Channel 78

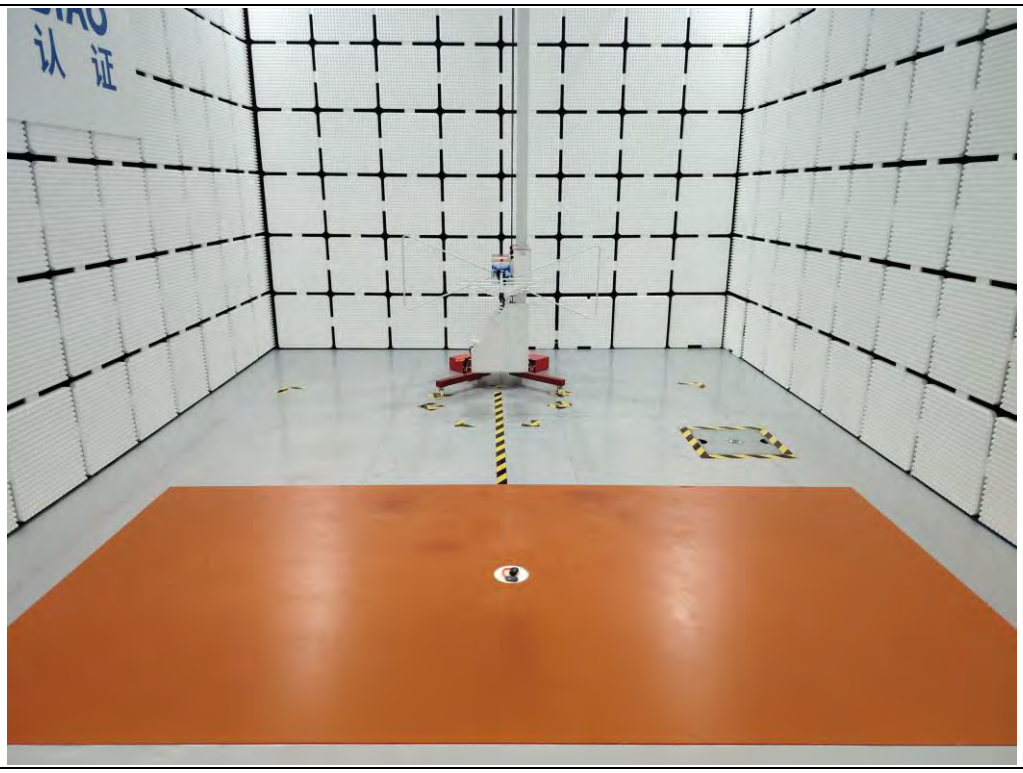


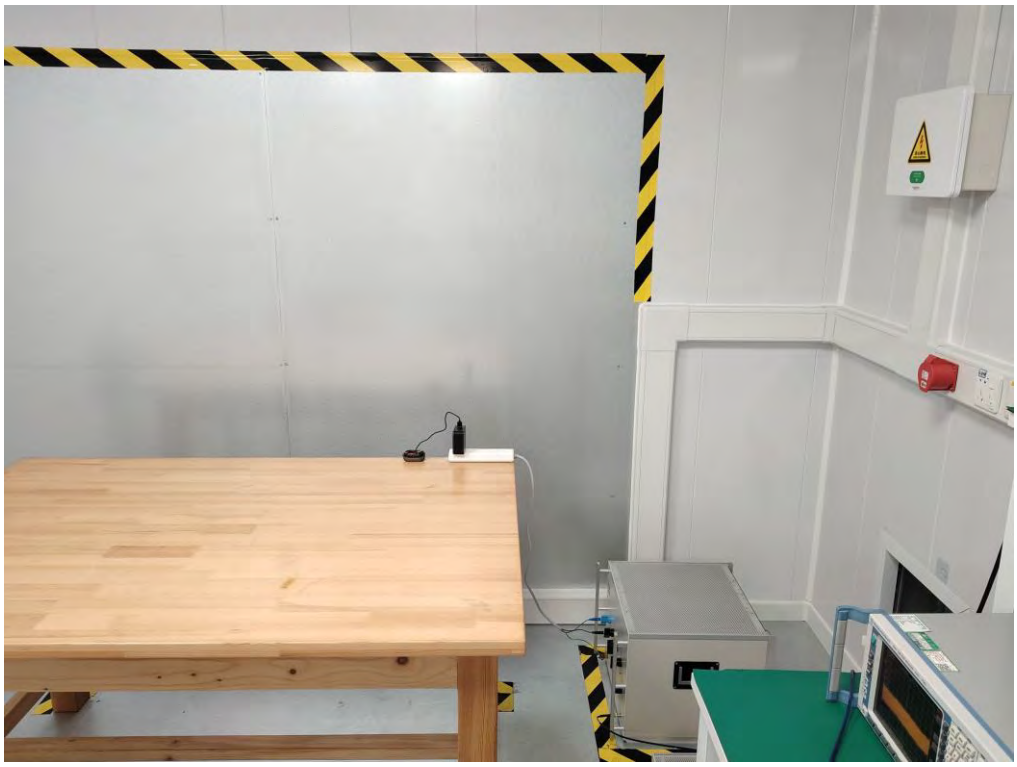

π/4-DQPSK on Channel 78



| 8DPSK on Channel 00 | 8DPSK on Channel 00 |
|---|---|
|  |  |
| **8DPSK on Channel 39** | **8DPSK on Channel 39** |
| |  |
| **8DPSK on Channel 78** | **8DPSK on Channel 78** |
|  |  |

# 6 Photographs of the Test Setup

| Radiated Emission Below 1GHz |
| --- |
|  |
| Radiated Emission Above 1GHz |
| |

| Conducted Emission |
| --- |
|  |

# 7 Photographs of the EUT

| Photo 1 |
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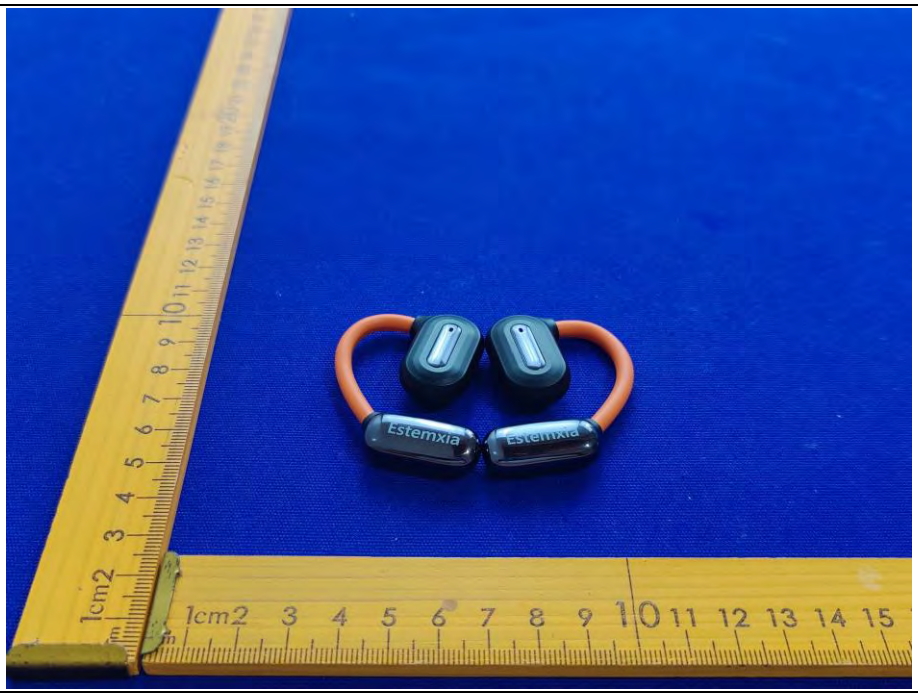
| |
| Photo 2 |
| |

| Photo 3 |
| --- |
| |
| Photo 4 |
|  |

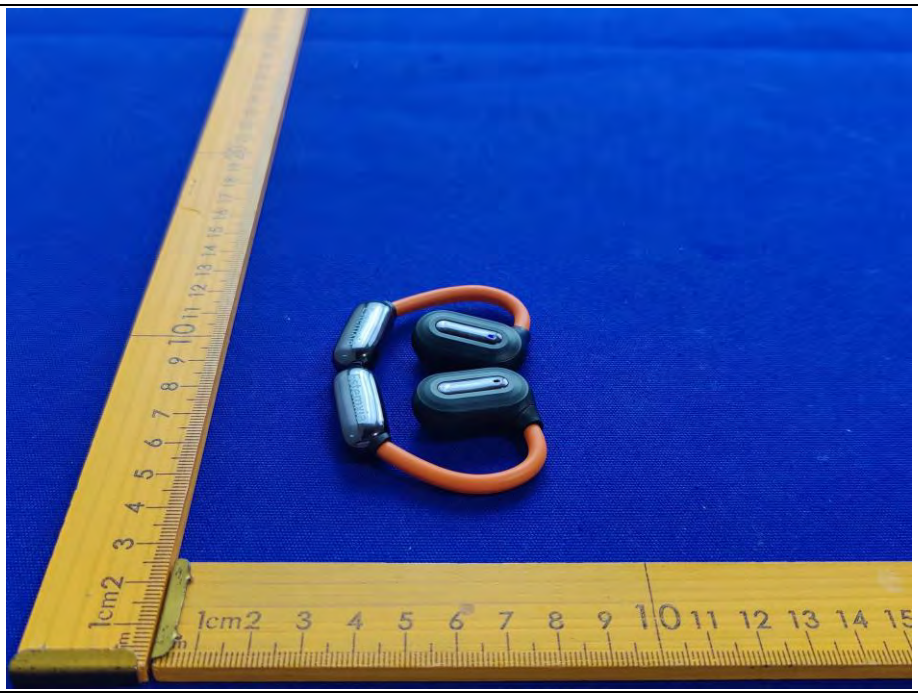
| Photo 5 |
| --- |
| |
| Photo 6 |
|  |

Photo 7

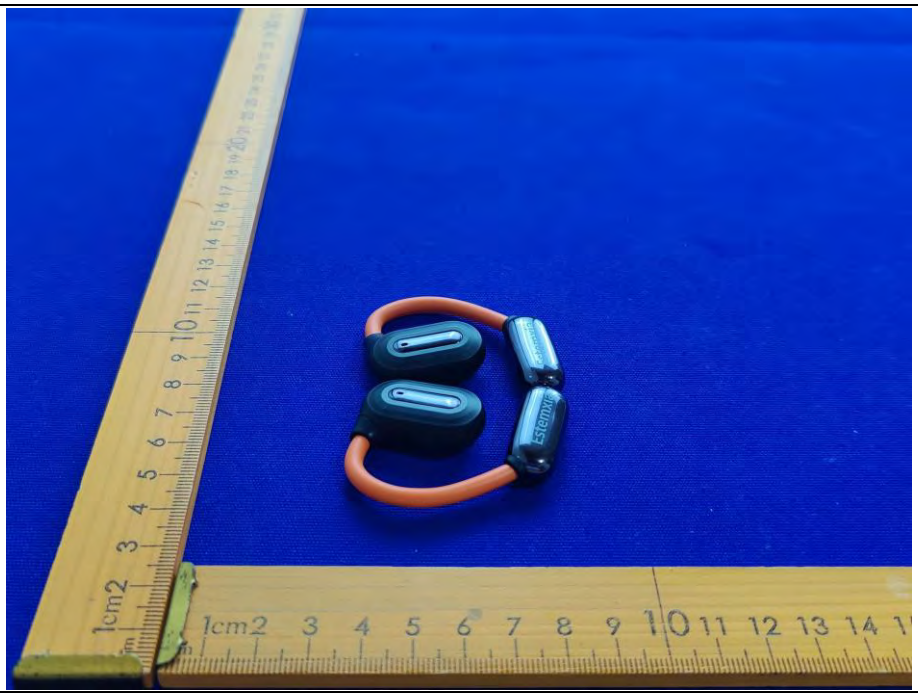


Photo 8

Photo 9

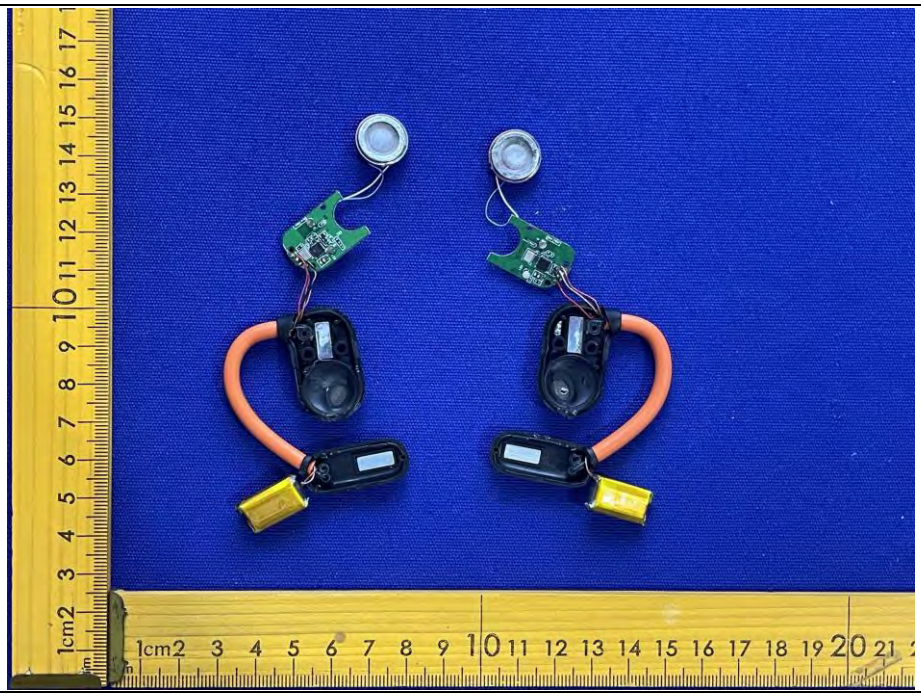


Photo 10

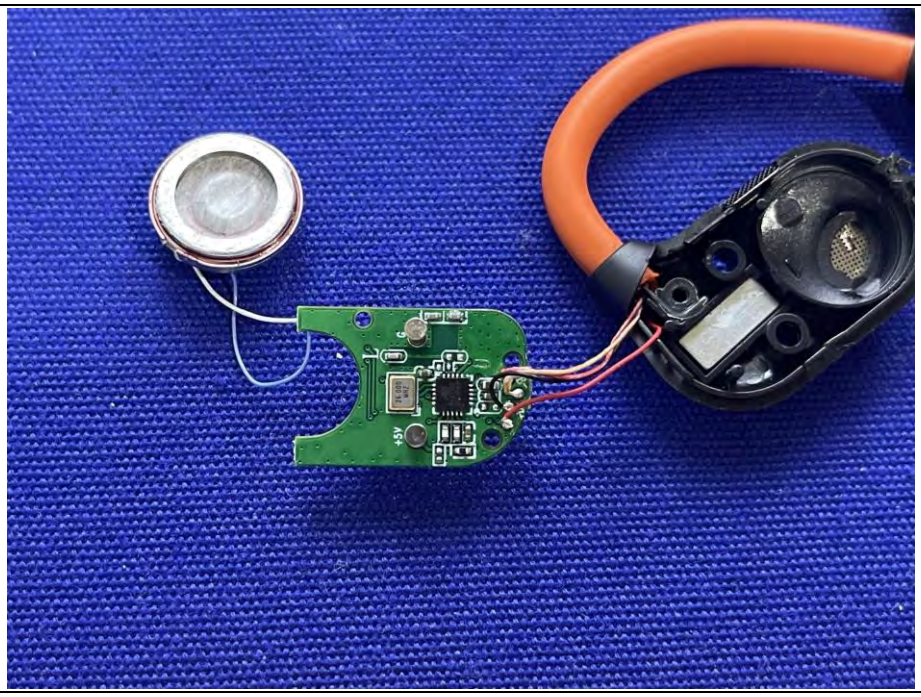


Photo 11

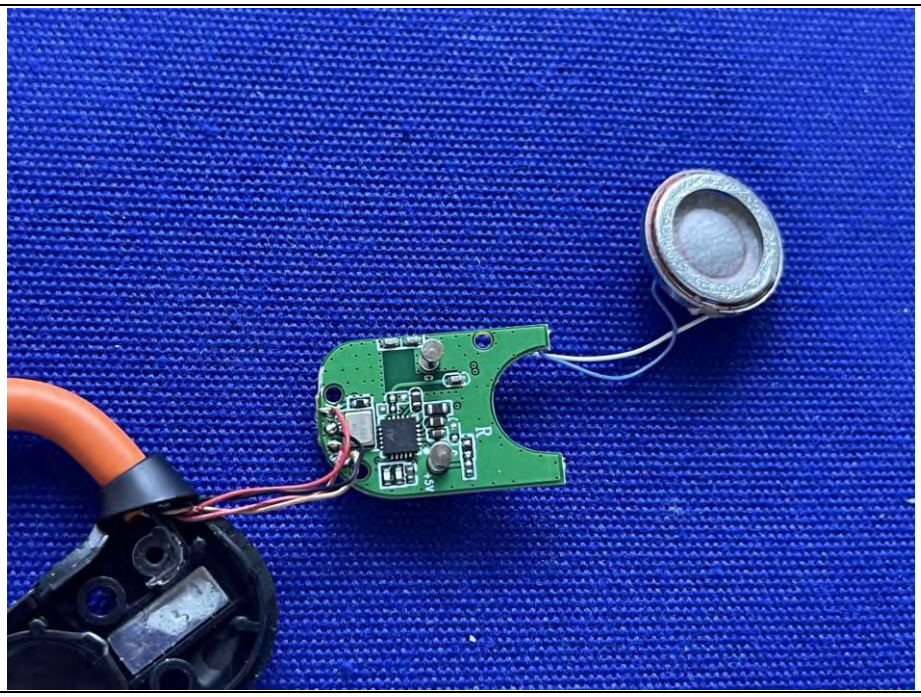
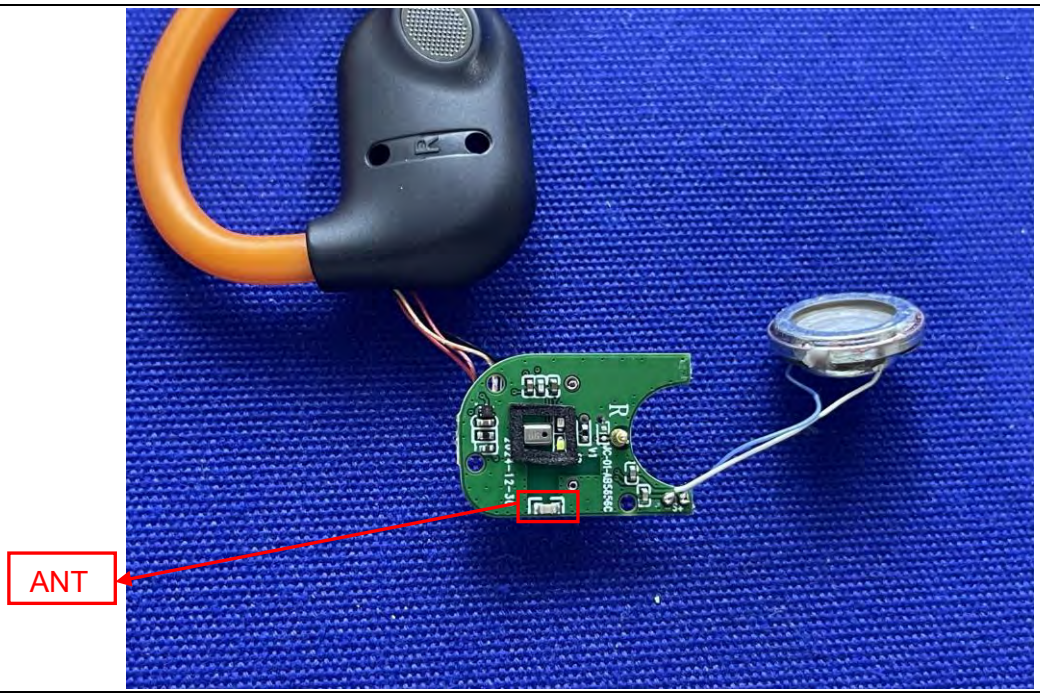


Photo 12



| Photo 13 |
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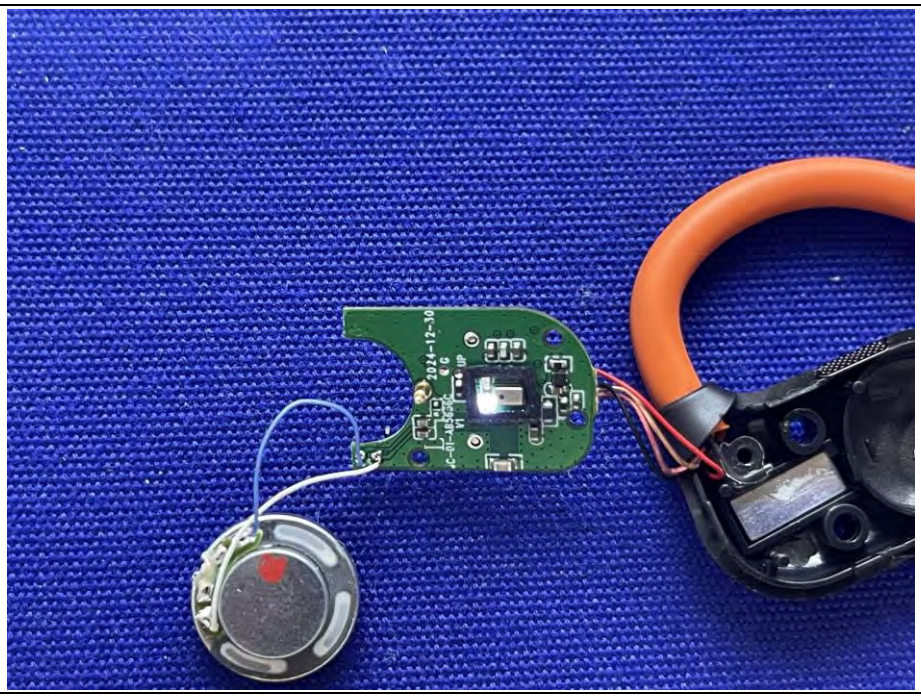
|  |

******** END OF REPORT ********